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2005 SOUTHEAST MINNESOTA REGIONAL RESEARCH AND DEMONSTRATION SUMMARY

The University of Minnesota Extension Service, University of Minnesota Southern Research and Outreach Center, Minnesota Soybean Research & Promotion Council, and University Center Rochester, as well as many local cooperators and agribusinesses, collaborated to conduct field trials throughout southeast Minnesota.

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

2005 Southeast Minnesota Regional Research and Demonstration Summary

I want to thank the University of Minnesota Extension and Research Team Members for the yearlong collaborative teamwork this report represents. Faculty from Extension Service, 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. We want to thank the regional producers, industry sponsors and state and county partners who have provided land, financial contributions and expertise to make these research trials possible.

Crop Management Tours, such as those conducted in Waseca, Potsdam and Rochester this year, 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.

An important aspect of this study is the involvement of student interns whose summer academic experience working with educational professionals provides opportunities to accelerate their own professional careers. We are actively discussing future projects and collaboration through campus connections that provide additional experiences with the University of Minnesota Extension Service 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 Centers.

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 the Extension Service are making a difference in Minnesota.

Respectfully,

Dr. LuAnn Hiniker
Campus Regional Director

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FIELD TRIALS – 2005

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Lisa Behnken, Regional Extension Educator
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Corey Stever, Ag Intern
Ryan Thelemann, Ag Intern
Angela White, Ag Intern
Matthew White, Ag Intern

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

POTSDAM

VARIETY TRIALS

Corn
Waxy Corn Hybrid Trial
Bt vs. Isoline Hybrid Trial
Corn Silage Trial

Alfalfa
Potato Leafhopper
Resistant vs. Susceptible
Variety Performance

Soybean
Roundup Ready® (1.3–1.8)
Roundup Ready® (1.9-2.5)
Short Season
Roundup Ready® (0.5-1.3)
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Value Added

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Evaluation of KIH-485 for wild proso millet control
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Evaluation of Adjuvant/Deposition Aids with Liberty®

Soybean
U of M Soybean Weed Management programs for southern MN
Evaluation of Weed Control with a Roundup Ready® & STS Stacked Soybean System
Evaluation of Select Max® plus Harmony GT® tank mixes for control of common lambsquarters & wild proso millet
Evaluation of A14535A for weed control in soybean

ALFALFA PLANT HEALTH

MustangMax® Applications on PLH Resistant & Susceptible Varieties

ROCHESTER

VARIETY TRIALS

Corn
Bt vs. Isoline Hybrid Trial

HERBICIDE TRIALS

Corn
Evaluation of Impact®, a new pigment inhibitor herbicide
Liberty® and Option® weed control programs
U of M Corn Weed Management Programs for southern MN
Evaluation of KIH-485 for woolly cupgrass control
Comparison of application timings of Callisto® & glyphosate products

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Plant Health Evaluation with Seed Treatments, Fungicides, and Insecticides
Soybean Rust/Aphid Sentinel Plot

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GOODHUE COUNTY

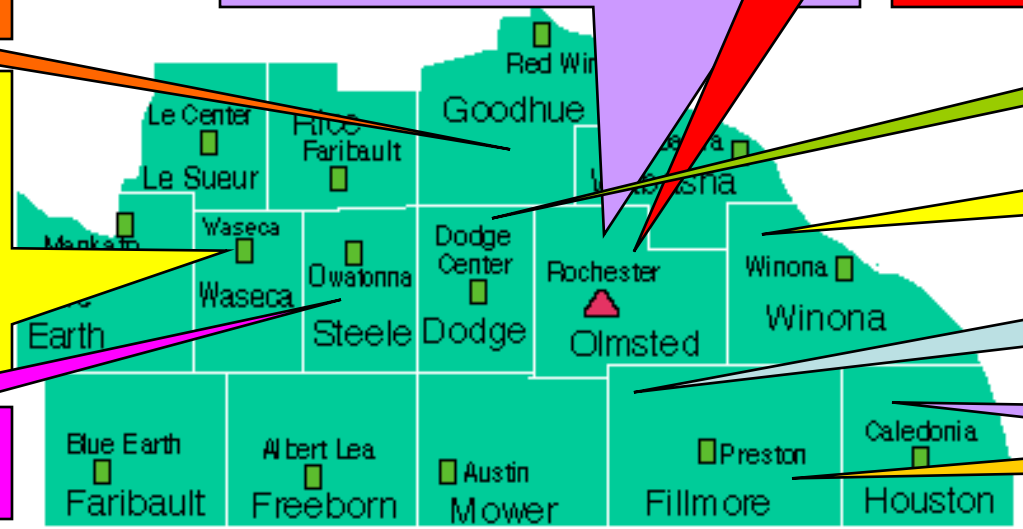
Soybean Rust/Aphid Sentinel Plot

WASECA

Waxy Corn Hybrid Trial
Bt vs Isoline Hybrid Trial
90-97 Day Corn Hybrid Trial
98-105 Day Corn Hybrid Trial
Roundup Ready® Soybean (1.3 – 1.8)
Roundup Ready® Soybean (1.9 – 2.5)
Short Season Roundup Ready® Soybean after Peas (0.5 – 1.3)
Value-Added Soybean
Soybean Rust/Aphid Sentinel Plot

HOPE

Value-Added Soybean
Waxy Corn Hybrid Trial



DODGE COUNTY

Soybean Rust/Aphid Sentinel Plot

LEWISTON

90-97 Day Corn Hybrid Trial
98-105 Day Corn Hybrid Trial
Soybean Rust/Aphid Sentinel Plot

SPRING VALLEY

Roundup Ready® Soybean (1.3-1.8)
Roundup Ready® Soybean (1.9-2.5)
Soybean Rust/Aphid Sentinel Plot

HOUSTON COUNTY

Soybean Rust/Aphid Sentinel Plot

HARMONY

Corn Silage Hybrid Trial

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Soybean

PRODUCTION MANAGEMENT

Check These Web Sites:

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

For More Information Call or E-Mail:

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

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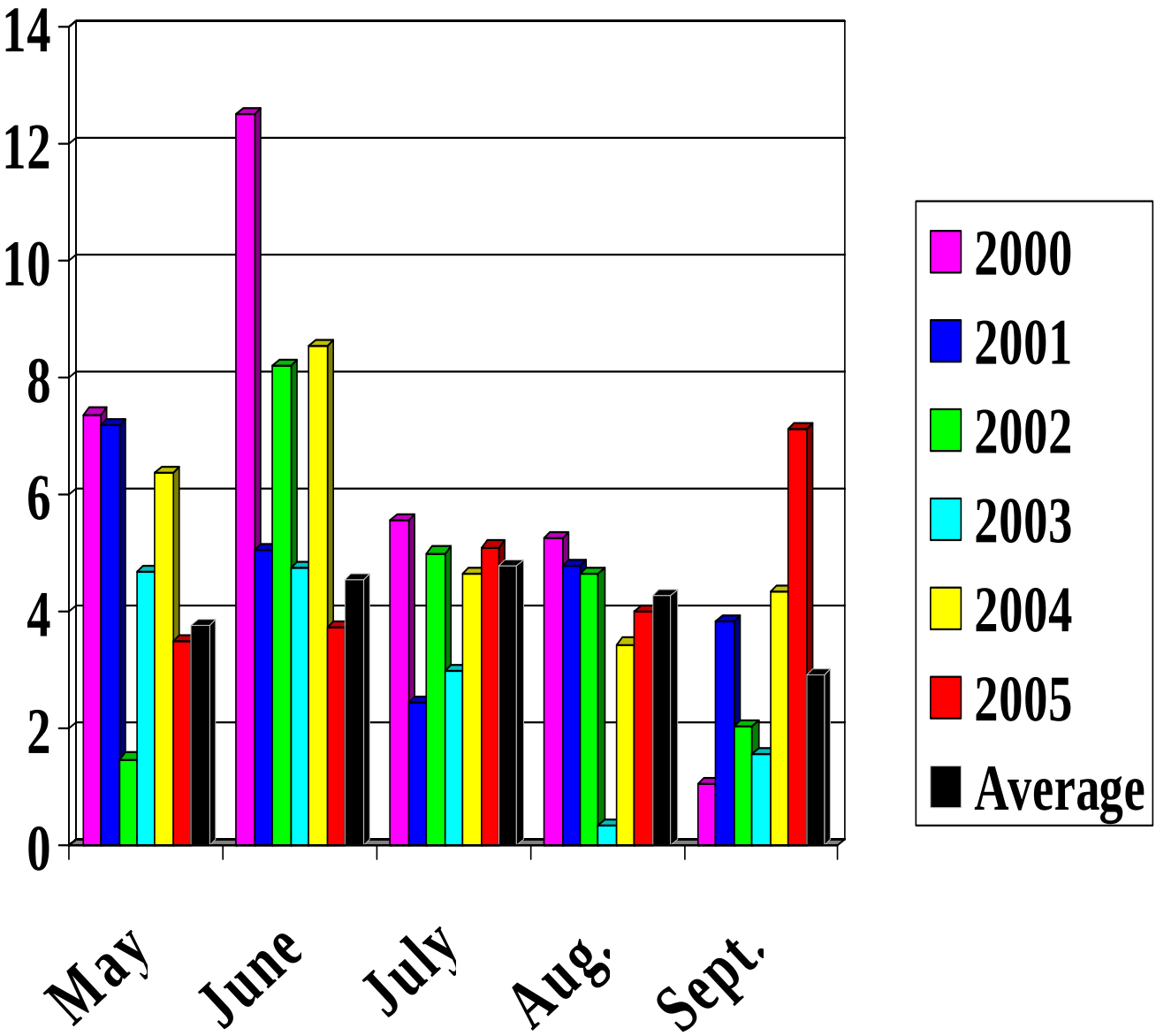
Matthew White	Ag Intern, Rochester
Jeff Vetsch	Assistant Scientist (SROC)

Monthly Rainfall Totals



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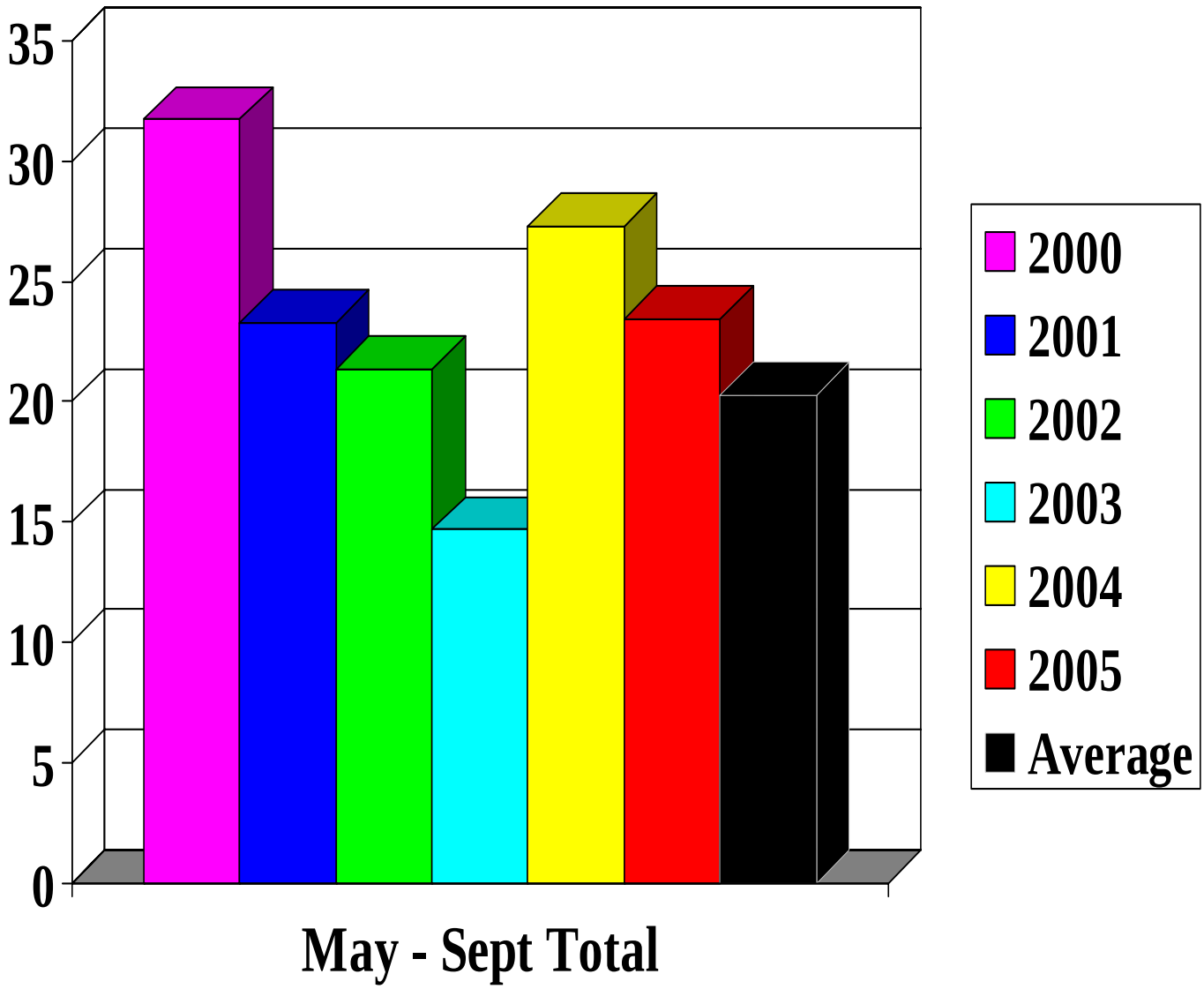
Seasonal Rainfall Total



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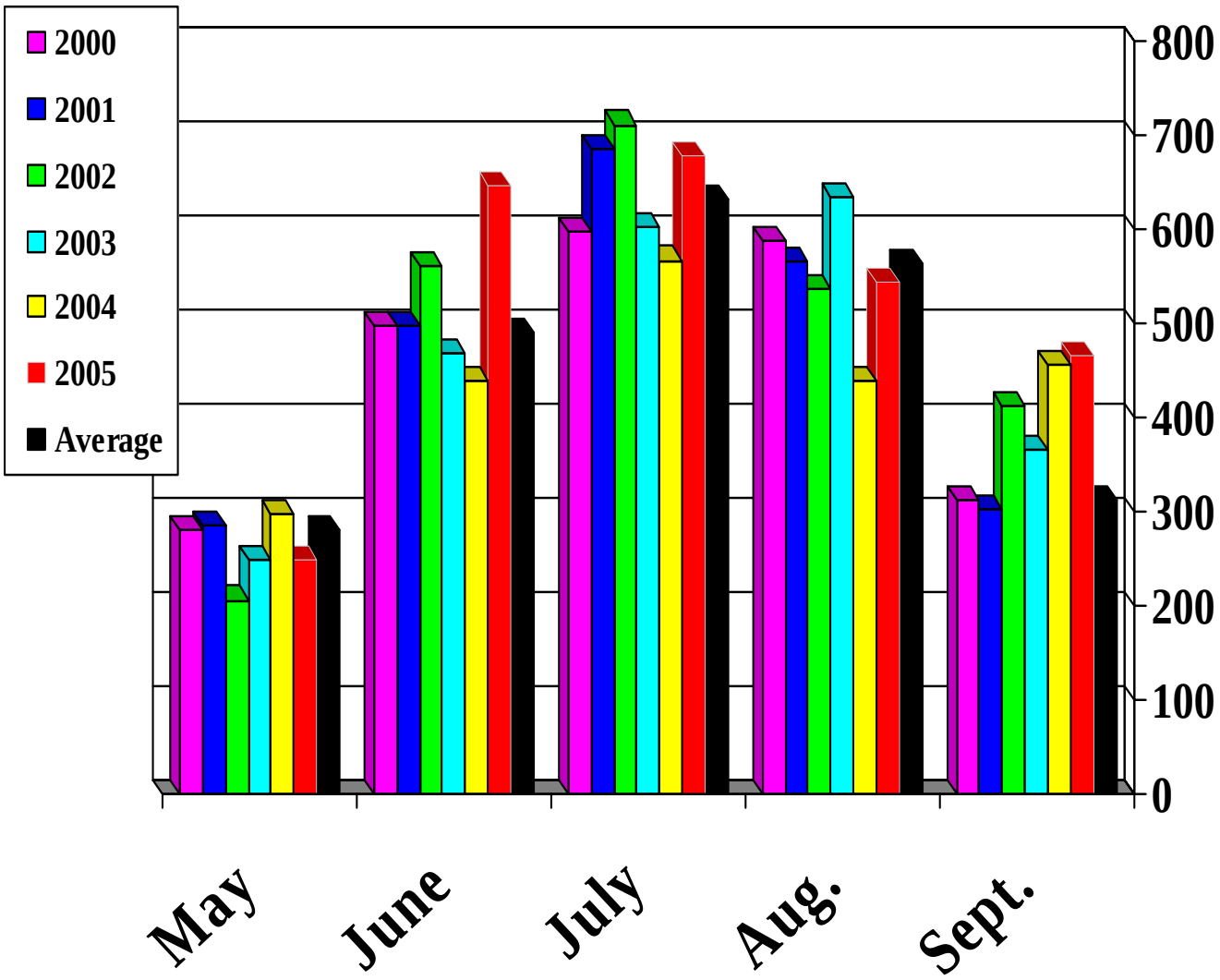
Monthly
Growing Degree Days



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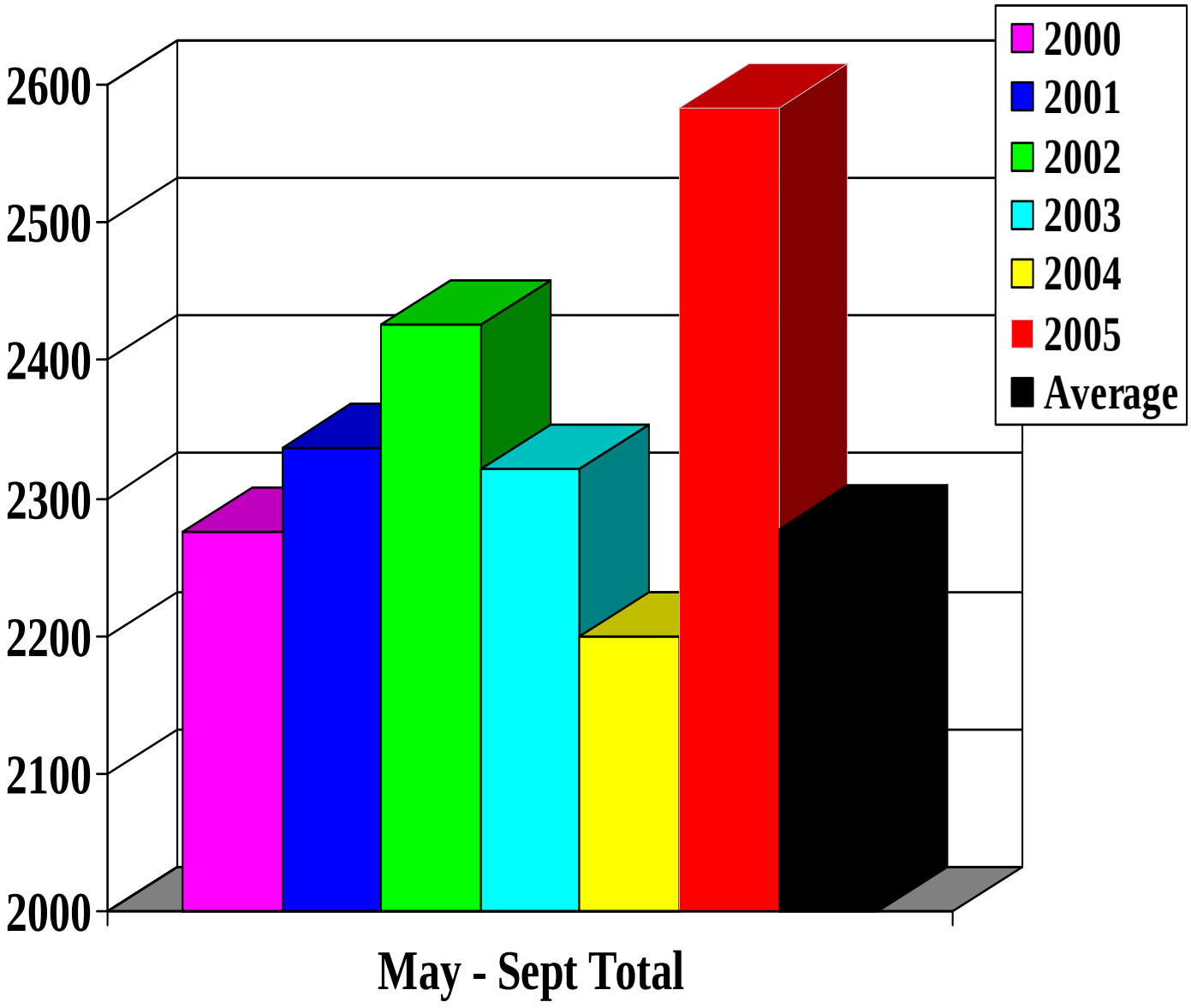
Season Total
Growing Degree Days



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VARIETY TRIALS

ALFALFA

Another Look at Potato Leafhopper Resistance in Alfalfa

2003-2005 Results

Lisa M. Behnken, Fritz R. Breitenbach
Regional Extension Educator, Agronomy
University of Minnesota Extension Service

Potato leafhopper nymph and adult

Damage

Potato leafhopper (PLH) nymphs and adults feed by piercing and sucking within the plant's phloem tissue. They secrete toxins that disrupt normal nutrient and water flow, resulting in stunted plants.

PLH feeding eventually causes yellowing of leaf tips, known as hopperburn.

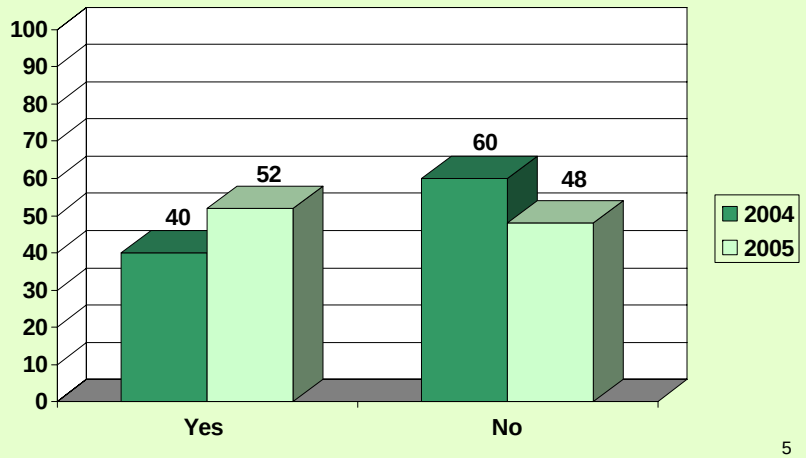
Damage results in losses of dry matter yield, protein content and quality.

Current Management: Scout, Sweep, and Spray

PLH Economic Threshold Level

Height (in.)	PLH per sweep
1	0.1
6	0.6
10	1.0
12	1.2

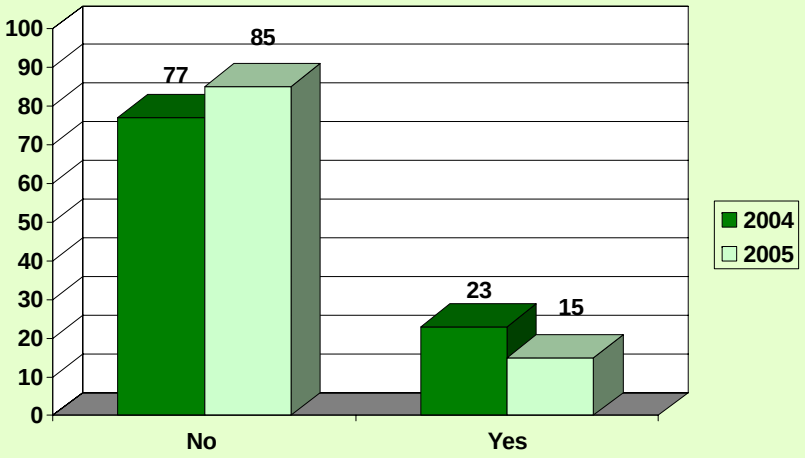
Have you sprayed alfalfa to control potato leafhopper?



Glandular-Haired Alfalfa

Potato Leafhopper-resistant germplasm was developed from wild-type plants having erect glandular hairs. This germplasm was released by USDA-ARS, Kansas State, and Purdue in mid-1980's.

Do you use potato leafhopper resistant alfalfa varieties on your farm?



Potato Leafhopper Resistance

- **First variety released in 1997**
- **Early varieties did not perform well:**
  - **Low expression to PLH (only 15-25%)**
  - **Yield Drag**
  - **Susceptible to major alfalfa diseases**
  - **Poor vigor**
  - **Not adapted to conditions in Midwest**

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Early varieties had only 15-25% PLH expression. This has increased to over 80% with the newest generation (5th) of PLH resistant varieties – breeders seed

(% of Plants with "Trait")

- Pioneer P54H91 > 85
- DeKalb A37-20HG > 85
- Evergreen 2 > 85
- Evergreen 79
- Green Leaf 70
- TMF 4355LH 55
- DK 131 HG 53
- ABT 227LH 48
- 6310 47
- DK 121 HG 35
- Arrest 34
- Trailblazer 33
- Defense + EV 32
- Amerig. 302 32
- CleanSweep 27
- PH-5347LH 20
- Interceptor 15

Mechanisms of PLH Resistance

1. **Entrapment**
2. **Antibiosis**
3. **Non-preference for oviposition**
4. **Tolerance**

Entrapment

Initial observations thought PLH got "stuck" on the ends of the glandular hairs (fly paper).

Further investigations suggests this is not the case and that entrapment is NOT an important mechanism for resistance. (many gladular-haired plants do not provide resistance)

Antibiosis

- **Antibiosis - An association between organisms that is harmful to one of them.**
- **Hogg and McCaslin, 1992, found survival of nymphs and adults to be lower on glandular haired plants – antibiosis.**
- **Elden and McCaslin, 1994, concluded that antibiosis is likely due to a chemical in the exudate from the glandular hairs.**
  - **Immature leafhoppers were very susceptible to the compound.**

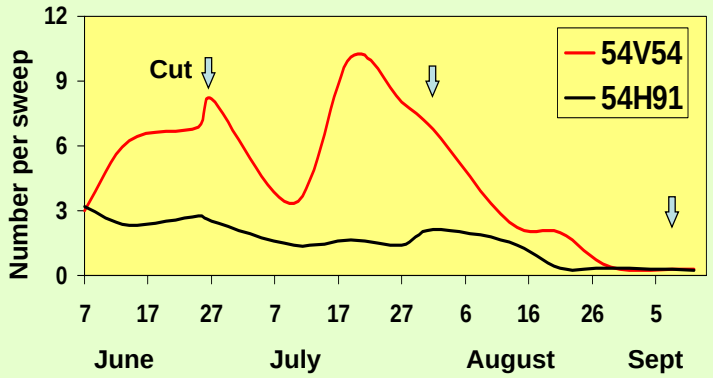
Non-preference

- **Evidence was found of non-preference in oviposition of PLH females on resistant alfalfa.**
- **PLH females avoided laying eggs on glandular-haired plants (Lamp and McCaslin, unpublished, University of Maryland)**

Tolerance

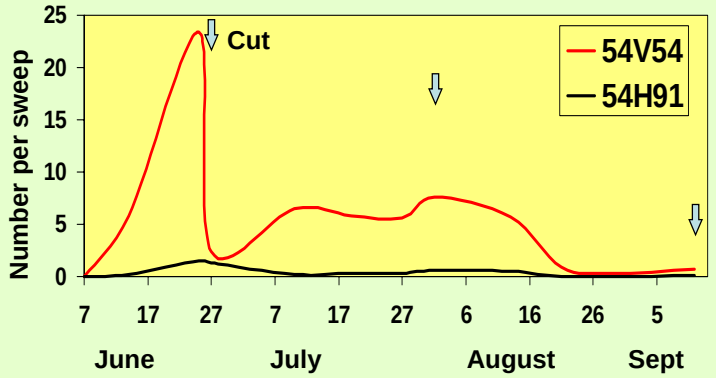
- **The first evidence for tolerance was observed by Lefko, et. al., 1998**
  - **PLH population required to cause economic damage was twice as high on PLH resistance varieties compared to susceptible ones.**
- **Research with the newest generation (5th) of PLH resistant alfalfa varieties by Sulc, McCormick, Hammond, and Miller, Ohio and Wisconsin recommends:**
  - **Economic threshold three times higher for varieties with 50% or higher (commercial seed) PLH resistance than for susceptible alfalfa**

PLH Adult Populations in New Resistant & Susceptible Alfalfa Varieties (2001 Seeding)



The Ohio State University

PLH Nymph Populations in New Resistant & Susceptible Alfalfa Varieties (2001 Seeding)



The Ohio State University

In the absence of leafhopper pressure...

Yield potential of early released PLH-resistant varieties was lower than standard susceptible varieties.

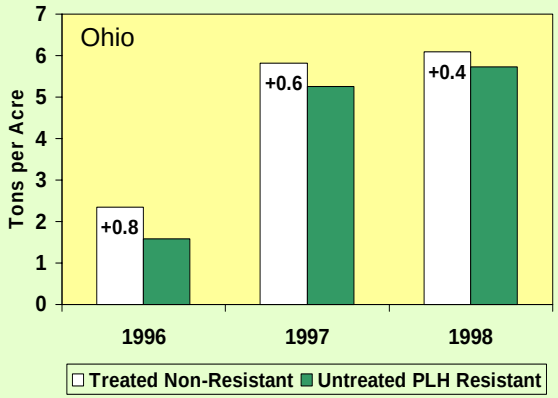
BUT, yield potential has been improved in the newest PLH-resistant varieties.

Ohio and Wisconsin Data

1997 and 1998 Results

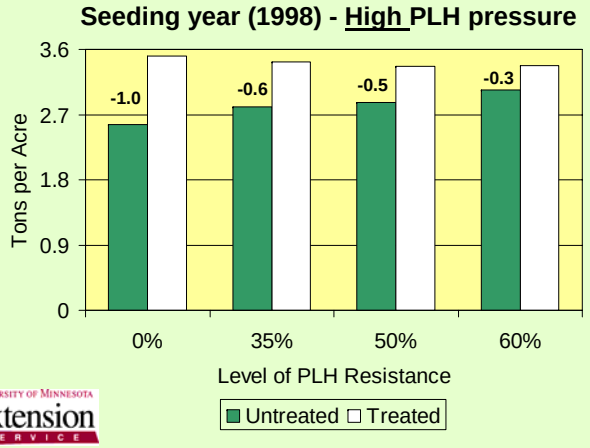
Variety PLH resistance	% resistance	97-98 Yield DM T/A (no spray)	97-98 Yield DM T/A (spray)	% Loss
3rd generation	70	7.26	8.09	11%
2nd generation	53	6.81	7.96	17%
1st generation	25	6.52	7.86	21%
susceptible	0	6.24	8.11	30%

Untreated Resistant (early releases) vs Treated PLH-Susceptible Alfalfa



Under heavy PLH pressure, untreated PLH-resistant alfalfa yielded less than treated non-resistant alfalfa.

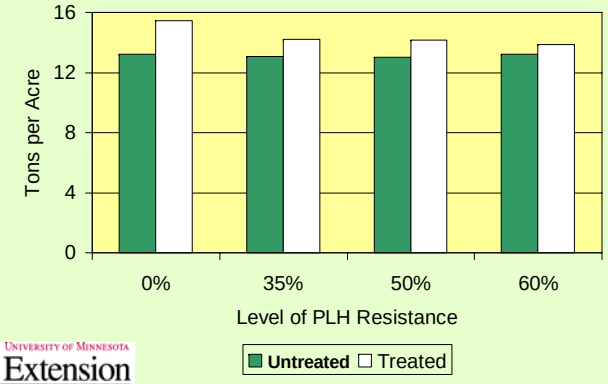
Yields of Alfalfa Having Various Levels of PLH Resistance



Yield loss from PLH damage declines as PLH resistance increases. (Ohio)

Yields of Alfalfa Having Various Levels of PLH Resistance

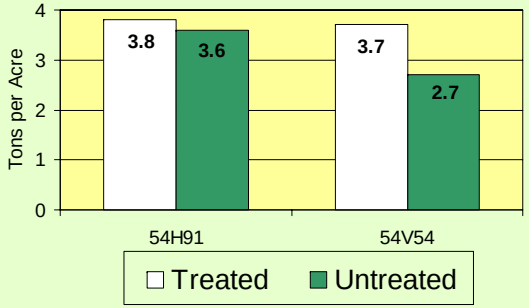
Established stand (1999-00) - Low PLH pressure



No advantage for resistance under low PLH pressure. (Ohio)

New Releases of PLH Resistant vs. Susceptible Alfalfa Varieties

Spring Seeding 2001 – Very high PLH pressure



Yield loss to PLH:

Resistant: 0.2 T/A 54H91

Susceptible: 1.0 T/A 54V54

(Ohio)

Alfalfa Potato Leafhopper Variety X Insecticide Trial

- The objective of this trial was to evaluate the performance of the newest generation of potato leafhopper (PLH) resistant varieties compared to susceptible varieties with and without insecticide.
- **PLH Trial location:** Potsdam, MN, 2003 - 2005
- **Planted:** April 25th, 2003
- **Four Varieties in 2003**
  - **Two PLH resistant varieties**
    - **Pioneer 54H91 & DK A37-20 HG**
  - **Two susceptible varieties**
    - **DeKalb A42-15 & Pioneer 54V46**

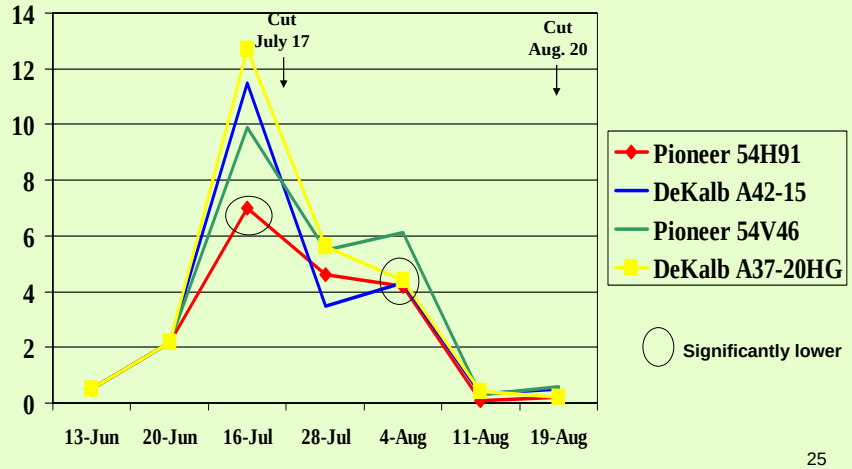
PLH Adult Population in PLH Resistant and Susceptible Alfalfa Varieties

Potsdam, MN, 2003 (Breitenbach and Behnken)

- Plots established on April 25, 2003 at Potsdam, MN (SE Minnesota)
- Treatments included a sprayed and unsprayed treatment for all varieties. Warrior insecticide was applied on June 23 and July 30, 2003.
- Average PLH populations were:
- >1/2/sweep on 7 inch alfalfa on June 13
- 2.2/sweep for 10 inch alfalfa on June 20 (2X Threshold)
- 3.2/sweep for 5.4 inch alfalfa on July 28 (6X Threshold)
- Plots were harvested on July 17 and August 20, 2003
- July 16 count:
- Pioneer 54H91 had significantly lower adult and nymph PLH numbers
- DeKalb A37-20HG had significantly lower nymph numbers than susceptible DK A42-15 and Pioneer 54V46.
- August 5:
- Pioneer 54H91 and DeKalb A37-20HG had significantly lower adult PLH numbers.
- Both PLH resistant varieties, Pioneer 54H91 and DeKalb A37-20HG, had lower PLH nymphs numbers than the susceptible varieties.

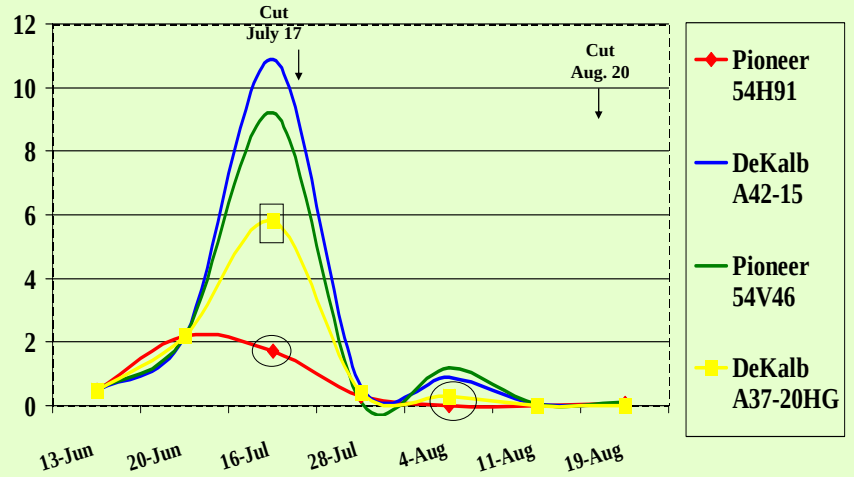
PLH Adult Population in PLH resistant and susceptible alfalfa varieties at Potsdam, MN, 2003

(2003 seeding without Warrior – PLH count/sweep).



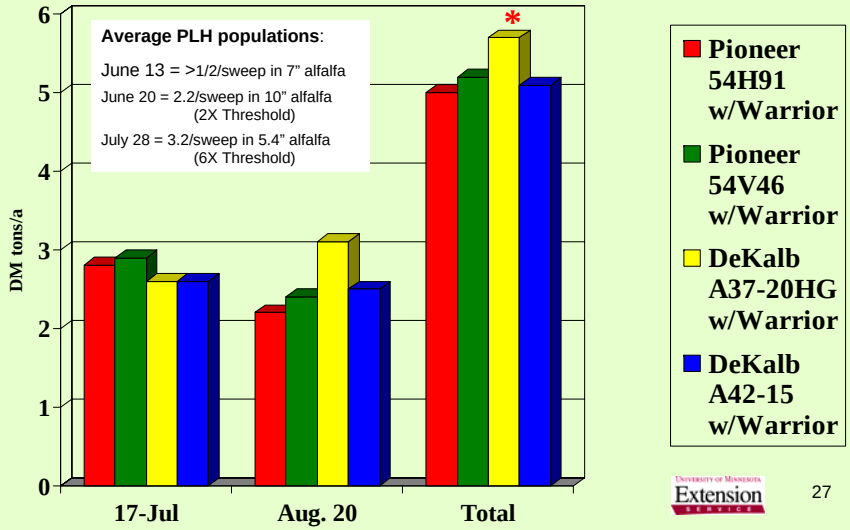
PLH Nymph population in PLH resistant and susceptible alfalfa varieties at Potsdam, MN, 2003

(2003 seeding without Warrior – PLH count/sweep).



Alfalfa Variety Yield with insecticide to control PLH at Potsdam, MN in 2003.

LSD (P=0.10) = 0.44 tons (* = significant)



Alfalfa Variety Yield without insecticide to control PLH at Potsdam, MN in 2003.

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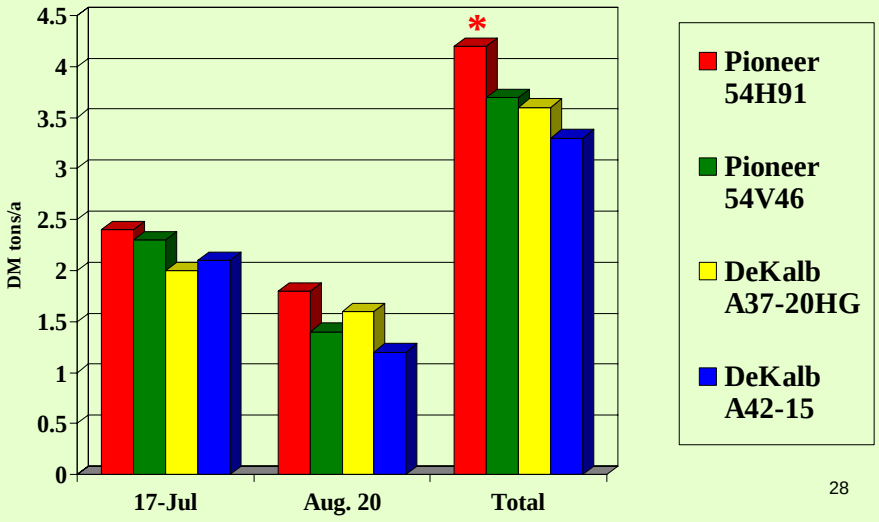
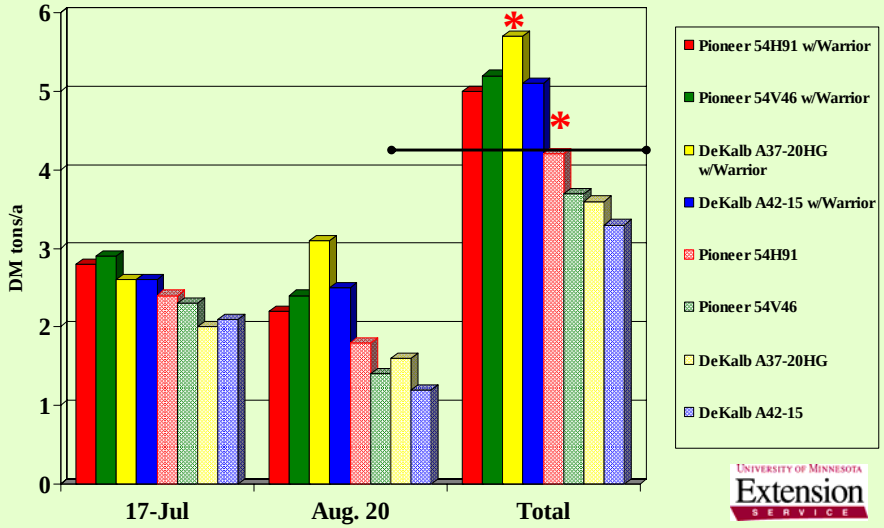


Alfalfa Variety Performance with and without insecticide to control PLH at Potsdam, MN, 2003.

Seeding year 2003. LSD = 0.44 tons/a (* = significant in their group)



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Conclusions
2003 Establishment Year

- Very heavy PLH pressure – 2X and 6X threshold
- In the sprayed treatments, the resistant variety, DeKalb A37-20HG, yielded significantly higher than the other varieties.
- In the unsprayed treatments, the resistant variety, Pioneer 54H91, yielded significantly higher than the other varieties.
- In the unsprayed treatments, both PLH Resistant varieties had lower PLH nymph numbers. Pioneer 54H91 had significantly lower adult and nymph numbers.

2004 DM Yields – PLH Alfalfa Trial

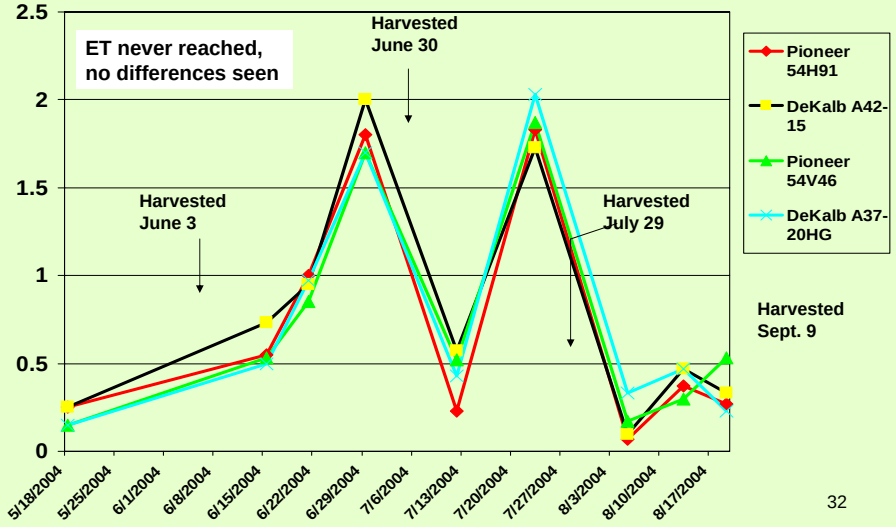
(Established in 2003)

- **This plot was not sprayed with insecticide in 2004. The PLH population never reached the economic threshold level.**
- **However, note the difference in yields for each variety, sprayed versus unsprayed in 2003 (seeding year). This plot had 2X to 6X economic threshold level of potato leafhopper numbers in 2003.**
- **Pioneer 54H91 (unsprayed in 2003) and 54V46 (sprayed and unsprayed in 2003) yielded significantly lower than both DeKalb varieties (sprayed and unsprayed in 2003).**
- **DeKalb A42-15, sprayed versus unsprayed in 2003, yielded significantly more in 2004. Some of this may be explained by Ohio researchers.**
  - **Ohio researchers found unsprayed resistant varieties lost yield only in the first cutting of the seeding year.**
  - **However, PLH damage in seeding year may result in <u>reduced</u> vigor of stand for the life of the stand**

2004 Potato Leafhopper Number per Sweep

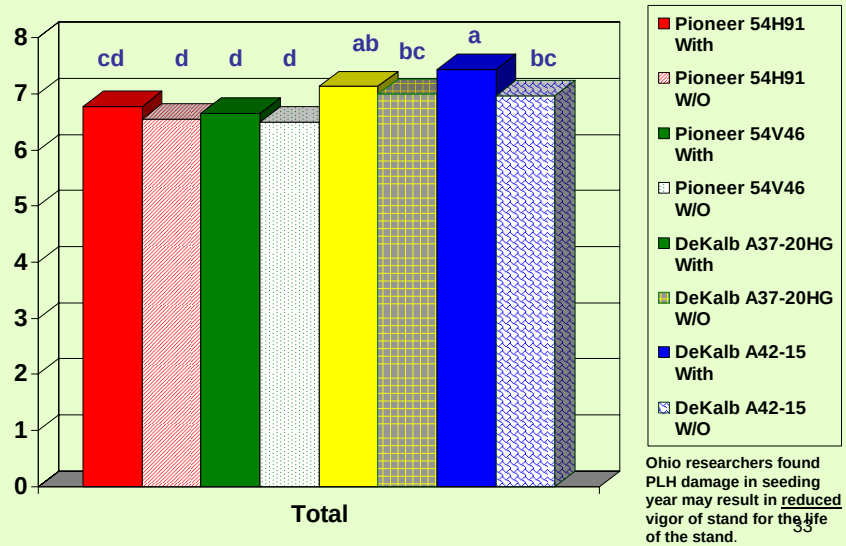
(2003 established alfalfa), Potsdam, MN.

The PLH population never reached economic threshold level in 2004.
There were no differences among treatments for PLH adult or nymphs.



2004 DM Yields – PLH Alfalfa Trial

(2003 Est Alfalfa)

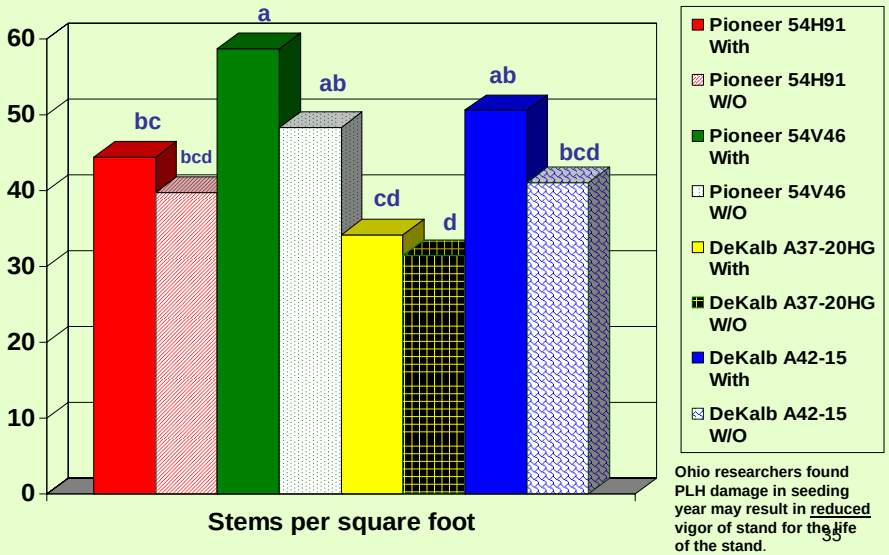


Ohio researchers found PLH damage in seeding year may result in reduced vigor of stand for the life of the stand.

2005 Results

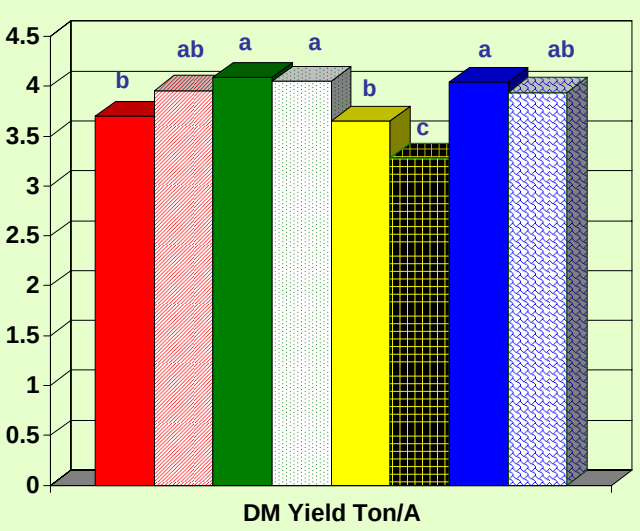
- **Stand counts were taken on May 10, 2005. DeKalb A37-20HG had a significantly lower stand count.**
- **Stand counts trended lower, stems/ft^2, in the unsprayed versus sprayed plots.**
- Yield Results
  - **The unsprayed PLH resistant DeKalb A37-30HG had a significantly lower yield than all other treatments.**
  - **Both resistant varieties (sprayed) had a lower yield than the susceptible varieties (sprayed establishment year)**

Plant Stand – May 2005



Ohio researchers found PLH damage in seeding year may result in reduced vigor of stand for the life of the stand.

2005DM Yields – PLH Alfalfa Trial



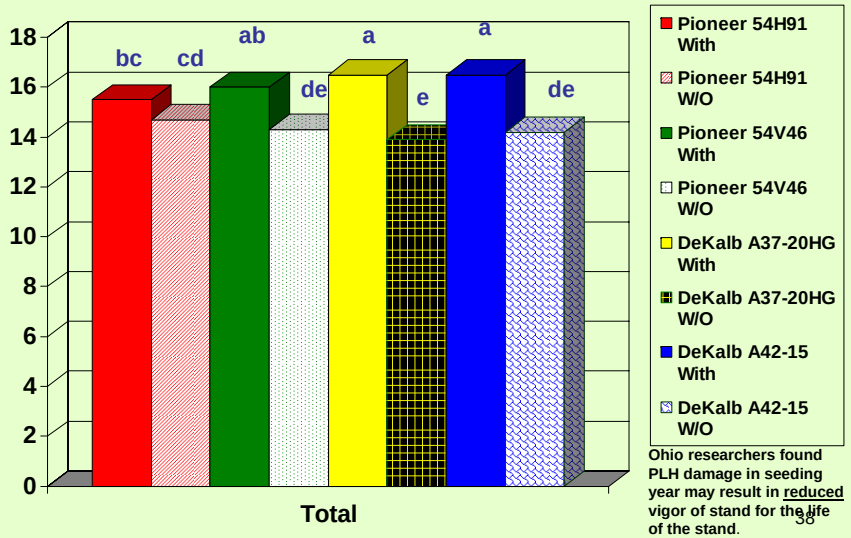
Ohio researchers found PLH damage in seeding year may result in reduced vigor of stand for the life of the stand.

2003 – 2005 Conclusions

- Stand counts and total 3-year yields trended lower in the unsprayed versus sprayed plots.
- There was a difference in the long term response of PLH resistance and susceptible varieties performance based on how PLH were managed the establishment year, with the exception of the PLH Resistant variety, Pioneer 54H91.
- This is consistent with data from Ohio suggesting a loss in vigor if PLH is not managed the seeding year.

2003-2005 DM Yields – PLH Alfalfa Trial

(2003 Est Alfalfa)



Ohio researchers found PLH damage in seeding year may result in reduced vigor of stand for the life of the stand.

Suggested management for varieties with over 50% PLH resistance (commercial seed)

- **Seeding year**
  - Treat with insecticide before 1st cutting if economic threshold (1X) reached
    - Ohio researchers found unsprayed resistant varieties lost yield only in the first cutting of the seeding year.
    - PLH damage in seeding year may result in reduced vigor of stand for the life of the stand.
  - After 1st cut, use an economic threshold of 3X
- **Production years**
  - Use an insecticide when PLH population reaches 3X the economic threshold used for susceptible varieties

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Take Another Look at PLH Resistant Alfalfa Varieties

- Higher yields (no drag)
- Improved agronomics & disease resistance
- Much greater PLH resistance (>85%, breeders seed)
  - PLH resistant varieties reduce PLH populations, especially nymphs.
- Consider PLH Resistant Varieties if:
  - Potato leafhoppers are a pest most years
  - Seed with a companion crop
  - Don't use insecticides
  - Don't scout your field

Sources:

Mark McCaslin and Dave Whalen,
Forage Genetics
Mike Peterson, W-L Research,
Madison, Wisconsin
R. Mark Sulc, Hal Willson, and John S. McCormack,
Ohio State University
Ronald H. Hammond,
Ohio Agric. Res. & Devel. Center
David Miller,
Pioneer Hi-Bred International
Paul Peterson, Craig Sheaffer, and Bill Hutchison
University of Minnesota
Fritz R. Breitenbach and Lisa M. Behnken,
University of Minnesota Extension Service

Evaluation of Potato Leafhopper Economic Threshold Levels and Control with Mustang Max in Resistant and Susceptible Alfalfa Varieties at Potsdam, MN in 2005.

Behnken, Lisa M., Fritz R. Breitenbach, Angela L. White, and Corey W. Stever.

The objective of this trial was to evaluate potato leafhopper (PLH) economic threshold levels and control with Mustang Max insecticide in resistant versus susceptible varieties in southeastern Minnesota. The research site was a Port Byron silt loam with a pH test of 6.7 and soil test P and K levels of 65 ppm and 273 ppm, respectively. The previous crop was corn. The field was field cultivated twice and cultipacked prior to planting. The alfalfa varieties, DeKalb A42-15 (susceptible) and DeKalb A37-20HG (resistant) were planted on May 10, 2005 at a depth of 0.5 inches in 7.5 inch rows at 15 lbs/A. A randomized complete block design with three replications was used. Postemergence (POST I, II, IIA, III, and IV) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Treatments were 1) Untreated check, 2) Automatic insecticide application at 4 inch regrowth, 3) Insecticide application at standard PLH Economic Threshold Level and 4) Insecticide application at three times the standard Economic Threshold Level. Plots were harvested three times, July 1, August 5 and September 1, 2005. PLH counts, adults and nymphs, and were taken throughout the summer. Application dates, environmental conditions, and crop and insect numbers are listed below.

Date	**June 17**	**June 20**	**July 11**	**July 11**	**JULY14**	**AUG 16**
Treatment		**POST I**	**POST II**	**POST IIA**	**POST III**	**POSTIV**
Temperature (F)						
Air		78	79	79	80	
Relative humidity (%)		53	50	50	76	
Wind (mph)		16	14	14	5	
Soil moisture						
DeKalb A42-15			Dry	Dry	Dry	
stage						
height (inch)	8	11	6	4.6	6.8	6.96
Potato leafhopper Count						
Adults/sweep	0.3	0.7	0.73	1.47	2.13	0.1
Nymphs / sweep	0.0	0.0	0.07	1.13	0.60	0.0
Total / sweep	0.3	0.7	0.80	2.60	2.73	0.1
DeKalb A37-30HG						
stage						
height (inch)	8	11	4.96	4.21	5.6	6.13
Potato leafhopper Count						
Adults/sweep	0.4	1.0	2.13	2.40	1.20	0.2
Nymphs / sweep	0.0	0.0	0.20	1.33	0.47	0.0
Total / sweep	0.4	1.0	2.33	3.73	1.67	0.2

Table 1. Yield of PLH resistant and susceptible alfalfa varieties when PLH controlled at different economic threshold levels at Potsdam, MN in 2005.

Treatment[a]	Variety	Alfalfa Yield First Cutting July 1	Alfalfa Yield Second Cutting August 5	Alfalfa Yield Third Cutting Sept 1	Total DM yield[b]
		(ton/A)	(ton/A)	(ton/A)	(tonsA)
1. Untreated	DeKalb A42-15	0.84	0.87	0.63	2.33 c
2. Automatic – 4 inch regrowth	DeKalb A42-15	0.90	0.96	0.78	2.64 b
3. Economic Threshold Level	DeKalb A42-15	0.87	0.97	0.74	2.58 b
4. Three times Economic Threshold Level	DeKalb A42-15	0.83	0.94	0.70	2.47 bc
5. Untreated	DeKalb A37-20HG	0.89	0.81	0.65	2.36 c
6. Automatic – 4 inch regrowth	DeKalb A37-20HG	1.12	1.02	0.93	3.07 a
7. Economic Threshold Level	DeKalb A37-20HG	0.99	0.94	0.66	2.58 b
8. Three times Economic Threshold Level	DeKalb A37-20HG	1.06	0.85	0.60	2.51 bc
	LSD (P = 0.10)	**0.21**	**0.13**	**0.12**	**0.19**

a. Treatments 2 and 6 had three insecticide applications. Treatments 3, 4, 7and 8 had one insecticide application.
b. Dry Matter Yield

Table 2. Alfalfa protein, RFV, and RFQ of PLH resistant and susceptible alfalfa varieties when PLH controlled at different economic threshold levels at Potsdam, MN in 2005.

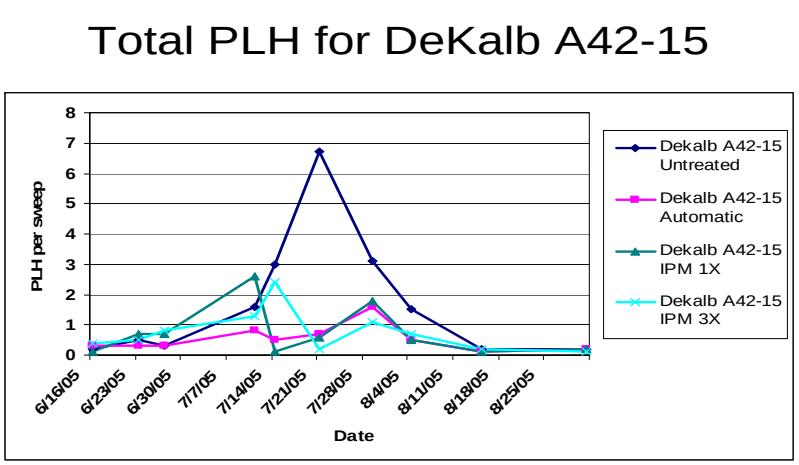
Character Rated Rating Data Type Rating Unit Rating Date	Alfalfa Protein 1st cut Jul-01-05	Alfalfa RFV 1st cut Jul-01-05	Alfalfa RFQ 1st cut Jul-01-05	Alfalfa Protein 2nd cut Aug-05-05	Alfalfa RFV 2nd cut Aug-05-05	Alfalfa RFQ 2nd cut Aug-05-05	Alfalfa Protein 3rd cut Sep-15-05	Alfalfa RFV 3rd cut Sep-15-05	Alfalfa RFQ 3rd cut Sep-15-05
Trt No. Treatment Name									
1 Dekalb A42-15 Untreated	23.3 ab	196 a	223 a	25.7 a	228 a	250 a	28.8 a	276 a	324 a
2 Dekalb A42-15 Automatic	23.9 a	208 a	227 a	25.7 a	222 ab	245 ab	28.8 a	264 ab	304 ab
3 Dekalb A42-15 IPM 1X				24.8 a	221 abc	240 abc	27.8 ab	254 ab	289 ab
4 Dekalb A42-15 IPM 3X				24.9 a	202 bc	221 bc	27.5 ab	231 ab	261 b
5 Dekalb A37-20 HG Untreated	21.2 c	216 a	257 a	24.0 a	196 c	218 c	28.1 a	266 ab	296 ab
6 Dekalb A37-20 HG Automatic	22.2 bc	202 a	234 a	25.1 a	215 abc	235 abc	26.2 b	221 b	254 b
7 Dekalb A37-20 HG IPM 1X				25.2 a	204 abc	218 c	27.9 ab	254 ab	281 ab
8 Dekalb A37-20 HG IPM 3X				25.4 a	213 abc	229 abc	27.3 ab	248 ab	282 ab
LSD (P=.10)	**1.4**	**31**	**58**	**1.9**	**25**	**27**	**1.8**	**46**	**51**

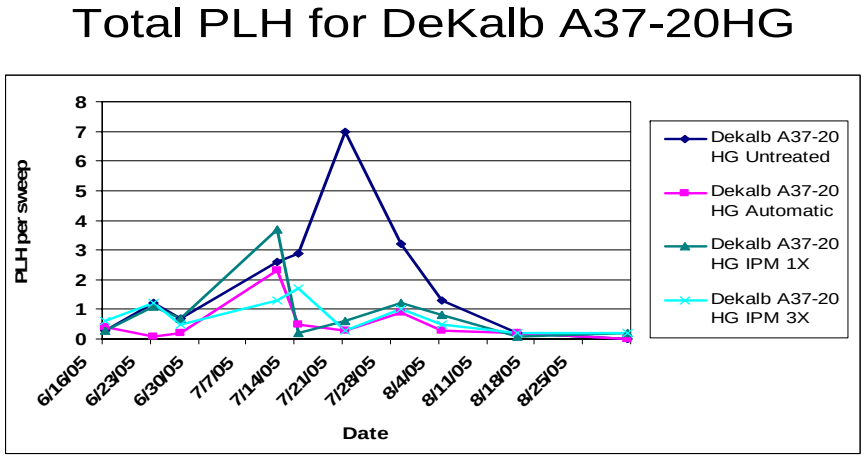
Means followed by same letter do not significantly differ (P=.10, LSD)

Table 3. Alfalfa (analyzed by variety) yield in tons/acre, milk/ton and milk/acre of PLH resistant and susceptible alfalfa varieties when PLH controlled at different economic threshold levels at Potsdam, MN in 2005.

Character Rated Rating Data Type Rating Unit Rating Date	Alfalfa Tons/Acre 1st cut Jul-01-05	Alfalfa Milk/Ton 1st cut Jul-01-05	Alfalfa Milk/Acre 1st cut Jul-01-05	Alfalfa Tons/Acre 2nd cut Aug-05-05	Alfalfa Milk/Ton 2nd cut Aug-05-05	Alfalfa Milk/Acre 2nd cut Aug-05-05	Alfalfa Tons/Acre 3rd cut Sep-15-05	Alfalfa Milk/Ton 3rd cut Sep-15-05	Alfalfa Milk/Acre 3rd cut Sep-15-05	Alfalfa Total Milk/Acre 3rd cut Sep-15-05
Trt No. Treatment Name										
1 Dekalb A42-15 Untreated	0.84 a	3052 a	2570 a	0.87 a	3072 a	2673 a	0.63 a	3406 a	2145 b	7389 c
2 Dekalb A42-15 Automatic	0.90 a	3034 a	2739 a	0.96 a	3080 a	2969 a	0.78 a	3306 a	2567 a	8275 a
3 Dekalb A42-15 IPM 1X	0.87 a	3052 a	2766 a	0.97 a	3015 a	2916 a	0.74 a	3232 ab	2383 ab	8965 ab
4 Dekalb A42-15 IPM 3X	0.83 a	3052 a	2526 a	0.94 a	2948 a	2780 a	0.70 a	3105 b	2174 ab	7480 bc
LSD (P=.10)	**0.17**	**30**	**568**	**0.12**	**145**	**428**	**0.10**	**200**	**413**	**617**
5 Dekalb A37-20 HG Untreated	0.89 a	3266 a	2914 a	0.81 b	2953 a	2378 b	0.65 b	3188 a	2068 ab	7361 c
6 Dekalb A37-20 HG Automatic	1.12 a	3091 a	3450 a	1.02 a	3004 a	3065 a	0.93 a	3103 a	2873 b	9388 a
7 Dekalb A37-20 HG IPM 1X	0.99 a	3266 a	3205 a	0.94 ab	2930 a	2711 ab	0.66 b	3128 a	2043 ab	7959 b
8 Dekalb A37-20 HG IPM 3X	1.06 a	3266 a	3495 a	0.85 ab	2957 a	2514 b	0.60 b	3198 a	1911 ab	7920 bc
LSD (P=.10)	**0.28**	**213**	**846**	**0.18**	**184**	**482**	**0.17**	**248**	**509**	**581**

Analyzed by variety
Means followed by same letter do not significantly differ (P=.10, LSD)





VARIETY TRIALS

CORN

2005 Minnesota Hybrid Corn Silage Performance Trials

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; they 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 primary 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:	Harmony, MN (Fillmore County) Potsdam, MN (Olmsted County)
Central Dairy Region:	Paynesville, MN (Stearns County) Melrose, MN (Stearns County)
West Central Dairy Region:	Ottertail, MN (Otter Tail County)

TEST PROCEDURE (Southeast and Central)

Design: Small plots were established at Harmony, Potsdam, 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 4 at the SE sites and May 10 at the Central MN sites. Plant nutrients as manure or inorganic fertilizer were applied to maximize plant yield. Cultivation and herbicides applied by University of Minnesota recommendation were used to control weeds.

Harvesting: Plots were harvested and whole-plant herbage sampled for yield and forage quality at each site. The harvest date was targeted at test sites when average whole-plant moisture across entries averaged 65%. In 2005,

harvest dates at Harmony, Potsdam, Paynesville and Melrose were September 12, September 14, September 16 and September 20, respectively.

TEST PROCEDURE (West Central)

Design: Large plots were established May 2 near Ottertail, MN under center pivot irrigation in a randomized complete block design with 3 replications. Hybrids were planted at a 34,000 seeds per acre with 30-inch row spacing. Fertilizer was applied at a pre-plant rate of 8000 gallons dairy manure per acre. Pre-emergent herbicide was applied to control weeds.

Harvesting: Plots were harvested and whole-plant herbage sampled for yield and forage quality on September 17.

RESULTS PROVIDED

Tables summarize hybrid yield and forage quality results from Harmony, Potsdam, Paynesville, Melrose and Ottertail, respectively. Relative maturity (RM), 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).

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 MILK2000 spreadsheet developed by the University of Wisconsin. MILK2000 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). Values based on field calculations for hybrid moisture and DM yield; laboratory values for CP, NDF, NDFD, starch and ash concentration; and book values for NDFCP (1.3%) and ether extract (3.2%) concentration were used for spreadsheet calculations. For MILK2000 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 trait and site is greater than the LSD value, there is a 90% probability that there is a real difference between the two hybrids for that parameter (i.e. moisture, yield, quality concentration, or milk production).

Prepared by the corn silage hybrid testing consortium: C.C. Sheaffer, P.R. Peterson, D.R. Swanson, T.R. Hoverstad, J.L. Halgerson, 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 Service.

PARTICIPATING COMPANIES

Name and address of companies participating in the 2005 hybrid corn silage performance trials are listed below:

Dairyland Seed Company, Inc., P O Box 958, West Bend, WI 53095
Dyna Gro Seed Company, 221 W Lake Lansing Rd Suite 102, East Lansing, MI 48823
Epley Bros. Hybrids, Inc., P O Box 310, Shell Rock, IA 50670
Garst Seed Company, 2369 330th St, Slater, IA 50244
Hyland Seeds, 2 Hyland Drive, Blenheim, Ontario, Canada N0P 1A0
Legacy Seeds, Inc., 210 Pine Street, Waupaca, WI 54981
Monsanto Seed Group, DeKalb Genetics, 3100 Sycamore Road, Dekalb, IL 60115
Nu Tech Seed Co., 307 3rd Street, Alice, ND 58031
Pioneer Hi-Bred, Int'l., 7000 NW 62nd Ave, Johnston, IA 50131
Producers Hybrids, P.O. Box C, Battle Creek, NE 68715
Renk Seed Company, 6800 Wilburn Rd, Sun Prairie, WI 53590
Syngenta Seeds, Inc. (NK), 7500 Olson Memorial Hwy., Golden Valley, MN 55427
Trelay Seeds, 11623 State Road 80N, Livingston, WI 53554

University of Minnesota

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids at Harmony, MN (Fillmore Co.) in 2005.

			Yield [1]		Quality(concentration) [2]					Milk Yield [3]	
Brand/ Hybrid entry	**RM**	**moisture**	**DM**	**silage**	**CP**	**NDF**	**IVD**	**NDFD**	**Starch**	**Ton**	**Acre**
	rating	%	- ton/ acre -				%			lb/ ton	lb/ acre
Pioneer 35Y67	106	65.3	11.9	34.3	7.2	34	82	47	41	3,700	44,100
Pioneer 33N29	113	68.4	11.9	37.7	7.2	36	81	49	39	3,640	43,400
NK N33-H6	101	66.0	11.6	34.0	7.8	36	81	47	38	3,610	41,700
Dyna-Gro DG55P57	102	65.1	11.6	33.2	7.4	38	79	46	35	3,470	40,300
Pioneer 34A86	106	67.8	11.4	35.5	7.9	38	80	48	38	3,510	40,200
Garst 8689IT	100	63.7	10.9	30.1	6.8	35	81	45	41	3,610	39,400
High Cycle 7748	109	69.7	11.6	38.2	7.4	38	79	45	37	3,400	39,400
High Cycle 6B413	107	64.8	11.1	31.4	7.2	35	81	44	41	3,510	38,800
DeKalb DKC 53-11	103	65.9	11.1	32.6	7.6	36	80	45	41	3,480	38,600
Epley E5112	112	69.8	11.0	36.5	7.8	36	81	47	40	3,480	38,400
Dairyland Stealth HiDF-3007	106	70.2	11.0	36.9	8.0	39	80	49	35	3,480	38,300
Garst 8579RR	100	69.5	10.6	34.7	7.5	36	81	48	41	3,600	38,100
Pioneer 35D28	108	68.7	10.7	34.2	6.8	37	80	46	40	3,510	37,600
High Cycle 7560	100	62.7	10.4	27.8	7.1	34	81	45	44	3,620	37,500
DeKalb DKC 52-23	102	63.7	10.0	27.6	7.3	34	82	47	42	3,740	37,500
DeKalb DKC 55-82	105	69.5	10.9	35.6	7.6	38	80	46	37	3,450	37,500
Pioneer 33D63	115	71.0	10.8	37.1	8.3	40	80	51	35	3,460	37,300
DeKalb DKC 54-51	104	68.5	10.9	34.7	7.6	39	79	46	37	3,410	37,300
Epley E1493	105	66.7	10.3	30.8	7.2	34	81	45	43	3,620	37,100
DeKalb DKC 57-30	107	68.5	10.4	32.9	7.4	37	80	45	41	3,500	36,200
Pioneer 34M93	108	67.7	10.7	33.1	7.1	41	78	46	34	3,310	35,400
DeKalb DKC 57-84	107	69.9	10.2	33.7	7.4	37	80	45	38	3,480	35,300
Renk RK684YGCB	106	66.3	9.8	28.9	7.5	36	80	44	40	3,520	34,300
Legacy Seeds L6160 Bt	108	65.9	9.7	28.4	7.5	36	81	46	41	3,520	34,100
Producers Hybrids SS110	110	69.4	10.3	33.6	8.2	43	78	49	30	3,270	33,600
Garst 8590RR	100	68.5	9.7	30.9	7.2	38	80	47	37	3,440	33,400
NK N49-E3	106	69.0	9.8	31.7	7.8	39	79	47	36	3,400	33,400
Renk RK854	111	69.6	9.5	31.2	7.6	39	78	45	34	3,290	31,300
Dairyland Stealth 1611	108	72.2	9.3	33.2	7.4	40	78	45	37	3,270	30,200
Dyna-Gro DG53P30	92	61.1	8.4	21.5	7.1	36	79	41	41	3,400	28,500
Producers Hybrids SS104RR	104	72.9	8.0	29.5	7.2	43	78	48	30	3,180	25,500
Mean		67.7	10.5	32.6	7.4	37	80	46	38	3,480	36,600
LSD(0.10)		2.7	1.6	4.2	0.4	2	2	2	3	200	6,800

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

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

[3] Milk production was estimated using spreasheet MILK2000 developed at the University of Wisconsin. Refer to *Results Provided* text for additional information.

University of Minnesota

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Potsdam, MN (Olmsted Co.) in 2005

Brand/ Hybrid entry	RM	moisture	Yield [1]		Quality(concentration) [2]					Milk Yield [3]	
			DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
	rating	%	- ton/ acre -				%			lb/ ton	lb/ acre
Garst 8689IT	100	63.9	12.2	33.7	7.3	34	82	47	42	3,710	45,200
Pioneer 35Y67	106	62.5	12.4	33.0	7.6	37	80	47	38	3,530	43,600
DeKalb DKC 55-82	105	65.2	12.3	35.3	8.0	36	81	47	40	3,530	43,300
Pioneer 34A86	106	62.5	11.7	31.2	7.9	36	81	48	40	3,610	42,300
High Cycle 7748	109	65.6	11.8	34.2	7.7	37	81	48	38	3,550	41,800
Dairyland Stealth 1611	108	67.3	11.7	35.7	8.0	37	81	48	38	3,510	41,100
High Cycle 6B413	107	63.2	11.0	29.8	7.8	33	83	48	41	3,730	41,000
DeKalb DKC 57-84	107	64.8	11.4	32.5	7.5	37	80	46	38	3,540	40,500
Pioneer 35D28	108	65.2	12.0	34.3	7.3	39	79	47	38	3,370	40,300
Renk RK854	111	66.6	12.2	36.4	7.6	40	79	46	32	3,270	39,800
DeKalb DKC 53-11	103	62.6	11.4	30.4	7.2	37	80	45	41	3,470	39,500
Pioneer 34M93	108	64.7	11.7	33.0	7.9	41	79	48	35	3,390	39,500
Dyna-Gro DG55P57	102	62.4	11.0	29.3	7.5	38	80	47	37	3,510	38,700
Legacy Seeds L6160 Bt	108	63.2	11.4	30.9	7.3	37	79	45	39	3,380	38,400
DeKalb DKC 57-30	107	63.3	11.1	30.3	7.3	38	79	45	39	3,410	37,900
Garst 8579RR	100	64.5	10.9	30.7	7.1	38	80	47	38	3,450	37,600
Producers Hybrids SS104RR	104	66.9	11.9	35.8	8.1	42	79	49	29	3,150	37,400
Dairyland Stealth HiDF-3007	106	67.2	11.0	33.4	8.0	39	80	49	33	3,400	37,300
Producers Hybrids SS110	110	65.0	11.1	31.6	8.6	41	79	50	31	3,350	37,100
NK N33-H6	101	64.1	11.1	30.9	8.6	39	80	50	31	3,340	37,000
Renk RK684YGCB	106	64.6	10.5	29.5	8.0	37	80	47	38	3,510	36,700
Garst 8590RR	100	65.9	10.7	31.4	7.1	41	79	48	33	3,350	35,800
DeKalb DKC 54-51	104	65.2	10.7	30.8	7.5	39	78	45	35	3,310	35,500
NK N49-E3	106	65.8	10.7	31.1	8.1	41	79	47	33	3,320	35,300
DeKalb DKC 52-23	102	60.2	10.2	25.5	6.8	36	80	44	41	3,440	35,000
Pioneer 33N29	113	67.2	10.5	32.1	7.4	41	79	47	33	3,320	34,900
Epley E1493	105	65.1	10.0	28.7	7.6	37	80	46	39	3,440	34,500
Pioneer 33D63	115	68.2	10.3	32.4	8.4	42	79	50	32	3,340	34,400
Epley E5112	112	66.6	10.4	31.1	7.6	40	78	46	35	3,260	33,800
Dyna-Gro DG53P30	92	58.3	9.7	23.1	7.0	34	81	43	43	3,500	33,800
High Cycle 7560	100	61.5	9.7	25.2	7.2	36	79	44	40	3,430	33,300
Mean		64.5	11.1	31.4	7.6	38	80	47	37	3,430	38,100
LSD(0.10)		1.9	ns	3.7	0.4	3	ns	2	4	230	ns

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

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

[3] Milk production was estimated using spreasheet MILK2000 developed at the University of Wisconsin. Refer to *Results* Provided text for additional information.

University of Minnesota

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Melrose, MN (Stearns Co.) in 2005

Brand/ Hybrid entry	RM	moisture	Yield [1]		Quality(concentration) [2]					Milk Yield [3]	
			DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
	rating	%	ton/ acre -				%			lb/ ton	lb/ acre
Legacy Seeds L4199 Bt	101	65.2	9.1	26.1	9.2	38	84	57	34	3,540	32,200
Garst 8748 YG1	101	70.0	8.5	28.4	10.0	36	86	62	34	3,710	31,700
Hyland Seeds HL 2676	101	68.9	8.1	26.1	9.7	38	84	59	35	3,610	29,300
DeKalb DKC 54-51	104	69.2	8.0	26.1	9.1	37	85	58	34	3,530	28,400
DeKalb DKC 50-20	100	70.2	7.2	24.0	10.1	33	88	63	39	3,930	28,100
Pioneer 34M93	108	71.9	8.1	28.8	9.2	41	83	57	31	3,430	27,700
Pioneer 34A86	106	70.6	8.0	27.3	10.3	40	84	61	28	3,410	27,400
Pioneer 35D28	108	71.7	8.5	29.9	9.4	44	81	57	27	3,230	27,300
Dairyland Stealth HiDF-4200	101	70.3	7.1	24.0	10.3	37	86	62	35	3,790	27,000
Renk RK632YGCB	102	68.8	7.4	23.6	10.8	38	86	63	31	3,650	26,900
Garst 8689 IT	104	69.4	7.8	25.3	8.0	37	84	58	32	3,460	26,800
Dyna-Gro 55F16	101	69.3	7.3	23.7	9.9	38	85	59	33	3,630	26,500
High Cycle 7560	100	69.8	7.4	24.5	10.7	40	84	61	34	3,580	26,500
Hyland Seeds HL S067	103	68.3	7.6	23.8	10.0	43	83	59	28	3,480	26,300
DeKalb DKC 48-52	98	65.8	7.3	21.2	9.2	37	84	56	35	3,580	26,000
Pioneer 37A92	97	65.7	6.4	18.6	10.8	33	88	63	37	3,930	25,100
Hyland Seeds HL S058	101	70.5	7.2	24.2	11.2	48	83	64	22	3,410	24,400
Dairyland Stealth 5007	103	73.9	6.9	26.3	10.4	42	83	61	35	3,540	24,300
DeKalb DKC 47-10	97	68.4	6.7	21.0	9.8	36	86	61	34	3,640	24,200
Legacy Seeds L3877 Bt/LL	95	65.7	6.5	18.8	10.1	36	86	60	34	3,750	24,200
Pioneer 35Y67	106	74.1	7.3	28.2	10.0	42	83	60	26	3,280	24,000
Renk RK684	104	72.9	6.8	25.0	11.5	43	84	63	27	3,540	24,000
Garst 8769 Bt	99	66.7	6.9	20.6	9.9	40	83	58	34	3,460	23,800
Producers Hybrids SS96RR	96	69.8	6.7	22.2	10.7	43	83	61	26	3,490	23,400
Hyland Seeds HL SR59	101	73.5	7.0	26.2	11.1	48	83	64	26	3,370	23,400
Legacy Seeds L4987	108	71.1	7.2	25.0	10.4	47	81	60	23	3,230	23,400
DeKalb DKC 42-95	92	70.6	6.6	22.4	9.8	38	85	60	30	3,550	23,300
Hyland Seeds HL S047	100	67.1	6.5	19.6	10.3	38	85	60	33	3,610	23,300
Garst 8922 YG1	90	72.0	7.1	25.2	9.9	41	83	59	26	3,290	23,200
Producers Hybrids 5152RR	91	69.8	6.3	20.8	9.8	37	85	61	31	3,590	22,500
Legacy Seeds L3077 Bt	95	71.0	6.3	21.6	9.2	38	84	58	34	3,580	22,500
Legacy Seeds L4237	100	71.8	6.4	22.7	9.4	39	84	59	31	3,490	22,300
Dairyland Stealth 1705	101	71.0	6.7	23.1	9.8	44	82	58	27	3,290	22,100
Renk RK452LLYGCB	94	67.6	6.3	19.3	11.1	40	84	61	28	3,510	22,000
NK N33-H6	101	71.3	6.3	21.8	10.9	41	83	59	27	3,480	21,800
Dyna-Gro CX05798	98	71.3	6.3	22.1	10.4	44	83	61	29	3,440	21,800
NK N49-E3	106	75.8	6.1	25.3	11.4	44	84	65	28	3,530	21,600
Dairyland Stealth 1602	98	71.0	5.9	20.2	11.2	45	82	61	24	3,360	19,600
Garst 8881 RR	95	69.4	5.7	18.4	9.1	38	83	56	32	3,440	19,400
Mean		70.0	7.0	23.6	10.1	40	84	60	31	3,520	24,800
LSD(0.10)		2.7	1.2	3.6	0.8	4	2	4	4	270	5,200

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

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

[3] Milk production was estimated using spreasheet MILK2000 developed at the University of Wisconsin. Refer to *Results Provided text for additional information.*

University of Minnesota

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Paynesville, MN (Stearns Co.) in 2005.

Brand/ Hybrid entry	RM	moist	Yield [1]		Quality(concentration) [2]					Milk Yield [3]	
			DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
	rating	%	ton/ acre -				%			lb/ ton	lb/ acre
DeKalb DKC 54-51	104	68.3	12.0	37.9	8.1	40	80	49	32	3,400	40,800
Garst 8689 IT	104	67.4	11.3	34.5	7.9	39	80	49	32	3,400	38,300
DeKalb DKC 50-20	100	65.0	10.8	30.7	7.5	36	80	45	39	3,500	37,600
Dairyland Stealth 5007	103	68.5	10.6	33.7	8.8	40	80	51	32	3,510	37,300
Garst 8922 YG1	90	63.8	10.5	28.9	7.9	36	81	46	38	3,490	36,500
Renk RK632YGCB	102	63.6	10.2	27.8	8.5	35	82	48	40	3,560	36,100
Legacy Seeds L4199 Bt	101	64.3	10.5	29.4	7.9	38	79	45	36	3,400	35,800
NK N49-E3	106	68.4	10.6	33.4	8.7	41	79	50	31	3,390	35,800
Dyna-Gro CX05798	98	64.8	11.0	31.2	8.1	41	78	46	31	3,250	35,700
DeKalb DKC 42-95	92	65.2	10.2	29.3	7.8	38	79	46	36	3,410	34,900
Legacy Seeds L4237	100	66.3	9.9	29.4	8.3	36	82	50	35	3,500	34,800
Garst 8748 YG1	101	68.8	10.2	32.6	8.5	38	80	49	32	3,390	34,500
Pioneer 35Y67	106	68.0	10.1	31.4	8.8	40	81	51	28	3,420	34,400
Renk RK684	104	68.2	10.3	32.4	9.0	40	79	48	29	3,330	34,400
DeKalb DKC 48-52	98	63.6	9.8	26.9	7.4	36	80	44	38	3,420	33,500
DeKalb DKC 47-10	97	62.4	9.4	24.9	7.9	35	81	46	41	3,550	33,300
Producers Hybrids SS96RR	96	64.7	10.1	28.6	7.7	41	77	45	33	3,250	32,900
Pioneer 34M93	108	68.3	10.5	33.1	8.2	45	76	48	28	3,120	32,700
Pioneer 35D28	108	68.0	10.5	32.8	7.9	44	76	47	31	3,110	32,700
High Cycle 7560	100	66.0	9.6	28.0	8.2	38	80	47	35	3,400	32,500
Pioneer 34A86	106	68.6	10.1	32.0	8.6	45	77	48	27	3,130	31,500
Producers Hybrids 5152RR	91	64.5	9.1	25.5	7.8	36	80	45	38	3,470	31,400
Hyland Seeds HL SR59	101	68.2	11.0	34.4	8.4	45	77	49	23	2,860	31,400
Hyland Seeds HL S058	101	68.5	10.1	32.0	8.7	43	79	50	25	3,090	31,200
Legacy Seeds L4987	108	69.8	9.9	32.6	9.0	44	78	50	25	3,150	31,100
Pioneer 37A92	97	63.5	9.1	24.8	8.8	37	80	46	34	3,380	30,600
Renk RK452LLYGCB	94	59.6	9.3	22.9	8.1	39	79	45	35	3,270	30,200
Legacy Seeds L3877 Bt/LL	95	58.3	9.3	22.2	8.1	38	79	44	36	3,240	30,000
Dairyland Stealth 1705	101	69.8	9.6	31.7	8.4	44	77	48	25	3,130	30,000
Garst 8769 Bt	99	61.3	8.9	23.0	7.8	39	80	47	34	3,330	29,700
Hyland Seeds HL S047	100	65.3	9.0	26.0	8.5	40	79	46	34	3,270	29,500
Legacy Seeds L3077 Bt	95	67.9	9.2	28.6	7.6	41	77	44	32	3,190	29,400
Garst 8881 RR	95	64.3	8.6	24.1	7.8	38	79	45	35	3,360	29,000
NK N33-H6	101	67.2	9.5	28.8	8.7	42	77	46	28	3,050	28,800
Hyland Seeds HL S067	103	68.5	9.5	30.1	8.9	45	76	47	26	3,020	28,600
Dairyland Stealth 1602	98	67.6	9.0	27.9	8.9	43	77	48	29	3,160	28,500
Dyna-Gro 55F16	101	66.4	9.0	26.7	8.2	42	77	44	30	3,110	27,900
Dairyland Stealth HiDF-4200	101	69.1	8.3	26.9	8.9	40	78	46	34	3,280	27,300
Hyland Seeds HL 2676	101	69.2	7.4	23.9	8.9	43	78	48	31	3,220	23,800
Mean		66.2	9.8	29.3	8.3	40	79	47	32	3,290	32,400
LSD(0.10)		2.4	1.5	4.1	0.6	3	2	2	4	220	5,900

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

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

[3] Milk production was estimated using spreasheet MILK2000 developed at the University of Wisconsin. Refer to *Results Provided text for additional information.*

University of Minnesota

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Ottertail, MN (Otter Tail County) in 2005.

Brand/ Hybrid entry	RM	moisture	Yield [1]		Quality(concentration) [2]					Milk Yield [3]	
			DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
	rating	%	ton/ acre -				%			lb/ ton	lb/ acre
Pioneer 38H69	100	66.6	6.3	19.0	7.7	39	81	52	35	3,520	22,300
Dekalb DKC 42-95	92	63.9	6.1	17.0	7.1	37	81	50	40	3,610	22,100
Pioneer 37R70	99	64.9	6.1	17.4	8.0	38	82	51	36	3,570	21,800
Dyna Gro CX05798	98	62.8	6.7	17.9	7.2	42	79	49	33	3,260	21,700
Hyland HLS058	101	66.7	6.7	20.0	7.8	42	79	50	31	3,250	21,700
Pioneer 38W22	92	62.8	6.1	16.4	7.5	38	81	51	35	3,490	21,300
Nu Tech QFO193	93	63.8	6.6	18.3	7.1	43	77	48	32	3,170	21,000
Pioneer 37A92	97	62.6	5.8	15.5	7.9	37	82	52	37	3,580	20,800
Dekalb DKC 40-05	90	63.7	6.0	16.5	7.2	40	79	48	35	3,380	20,200
Nu Tech QFO100	100	69.7	6.4	21.0	7.4	44	79	52	27	3,130	19,900
Dyna Gro 55F53	102	67.0	6.3	19.0	7.2	43	77	45	33	3,120	19,600
NK Seeds N33-H6	93	68.6	6.3	20.2	7.3	44	78	50	27	3,090	19,600
Hyland HLS009	73	52.7	6.0	12.7	7.4	39	80	48	35	3,220	19,300
Mean		64.3	6.3	17.8	7.4	40	80	50	33	3,340	20,900
LSD(0.10)		2.0	ns	2.2	0.4	3	2	2	3	180	ns

[1] **DM** yield is whole-plant corn yield at 100% dry matter; **Silage** yield is whole-plant corn yield at harvest moisture.
[2] Quality concentration desciption expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to Results Provided text for additional information.
[3] Milk production was estimated using spreasheet MILK2000 developed at the University of Wisconsin. Refer to *Results Provided text for additional information.*

Comparison of Short Season Corn Hybrids, 90 to 97 day relative maturity, at Lewiston and Waseca, Minnesota in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, and Jerry A. Tesmer

The objective of these studies was to compare the performance of short season corn hybrids, 90 to 97 day relative maturity, in southern Minnesota. The trials were located at Lewiston 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 31,000 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 with grain weight and moisture recorded at all sites.

Formula for calculating gross economic return:
(Harvested bushels per acre times the dollar bushel revenues per acre of $1.84) minus drying cost per acre of ((grain moisture minus 15%) X (bushels per acre) X ($0.03)) In general, grain yield is still the best indicator of hybrid performance. However, grain moisture is important when looking at gross dollar return. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Field History for Short Season Corn Varieties Research Sites.

	Lewiston (Ted Olson Farm)	Waseca
Planting Date	May 3, 2005	May 3, 2005
Soil Type	Port Byron silt loam	Port Byron silt loam
Fertilizer (N-P-K)	150 lb/A nitrogen 46 lb/A phosphorus 60 lb/A potash	Fall applied 27 lb/A nitrogen 70 lb/A phosphorus 120 lb/A potash Spring applied 160 lb/A nitrogen as anhydrous ammonia
Herbicide Pre/Post	Lumax 3 qt/A	6 pt/A Lumax on May 4, 2005
Harvest Date	October 27, 2005	October 24, 2005
Tillage	Conventional- tillage	Two pass with field cultivator on May 1
Previous Crop	Soybean	Soybean

Table 2. Corn hybrid grain yield (15.5%) and moisture at Lewiston and Waseca, MN in 2005.

Entry Name	Description	Lewiston		Waseca		Ave	Ave
90 to 97 Day Relative Maturity	Day	moisture (%)	yield (Bu/A)	moisture (%)	yield (bu/A)	moisture (%)	Yield (Bu/A)
AgriGold Hybrids A6205Bt	96	19.1	241	15.7	218	17.4	229
AGVENTURE AV 4880 CB	95	19.1	244	15.8	201	17.5	223
Brownseed 3000 YGCB	90	18.9	235	15.6	220	17.3	227
Croplan Genetics 364 RR	96	19.0	238	15.5	224	17.3	231
Crows 1695 B	92	19.0	233	15.6	220	17.3	226
Crows 1703B	95	19.2	246	15.9	244	17.6	245
DeKalb DKC 42-88	92	18.7	233	15.2	227	17.0	230
DeKalb DKC 46-24	96	19.1	239	15.8	225	17.5	232
Dyna Gro DG53P30	94	19.2	238	16.0	230	17.6	234
Dyna Gro DG53F09	93	18.8	230	15.6	236	17.2	233
Garst 8880YG1	96	19.5	238	15.8	216	17.7	227
Garst 8921YG1/RR	92	19.3	224	15.8	223	17.6	224
Gold Country Seed 92-01 CBR	92	19.4	227	15.4	223	17.4	225
Gold Country Seed 94-01 CB	94	19.1	242	15.5	223	17.3	233
Golden Harvest H-6476 BT/RR	90	19.2	231	15.9	207	17.6	219
Golden Harvest H-7007 Bt	96	19.3	243	16.3	218	17.8	230
High Cycle by Trelay 4G721	96	19.5	230	15.9	216	17.7	223
High Cycle by Trelay 7242	90	19.0	229	15.4	211	17.2	220
Kaltenberg K3735Bt	90	19.7	207	15.7	224	17.7	215
Kaltenberg K4688Bt	96	19.6	242	15.9	223	17.8	232
LG Seeds LG 2407 RR	90	19.3	237	15.6	220	17.5	229
LG Seeds LG 2463 Bt	96	19.3	243	15.7	228	17.5	235
Mycogen 2K350	93	18.6	221	15.4	215	17.0	218
Mycogen 2R426	97	19.6	239	15.7	228	17.7	234
NK Brand N29-A2	92	19.5	234	15.5	224	17.5	229
NK Brand N34-F1	94	19.6	234	16.1	220	17.9	227
Pioneer Brand 37A92	97	19.1	226	15.6	215	17.4	221
Pioneer Brand 38W22	93	19.4	216	15.6	237	17.5	226
Producers Hybrids 5154	91	19.1	229	15.8	209	17.5	219
Producers Hybrids 5623	96	20.2	254	15.9	241	18.1	247
Renk RK 438	92	19.2	226	15.6	237	17.4	231
Renk RK 452	94	19.5	229	15.9	217	17.7	223
LSD (P=0.10)		**0.5**	**11**	**0.4**	**22**	**0.3**	**12**

Table 3. Average grain yield (15.5%), moisture, and economic return, ranked by yield in 2005.

Entry Name	Description	Average moisture	Average Yield	Gross Return
90 to 97 Day Relative Maturity	Day	(%)	(Bu/A)	Less drying
Producers Hybrids 5623	96	18.1	247	$431.51
Crows 1703B	95	17.6	245	$431.69
LG Seeds LG 2463 Bt	96	17.5	235	$414.78
Mycogen 2R426	97	17.7	234	$411.61
Dyna Gro DG53P30	94	17.6	234	$412.31
Gold Country Seed 94-01 CB	94	17.3	233	$412.64
Dyna Gro DG53F09	93	17.2	233	$413.34
DeKalb DKC 46-24	96	17.5	232	$409.48
Kaltenberg K4688Bt	96	17.8	232	$407.39
Renk RK 438	92	17.4	231	$408.41
Croplan Genetics 364 RR	96	17.3	231	$409.10
DeKalb DKC 42-88	92	17.0	230	$409.40
Golden Harvest H-7007 Bt	96	17.8	230	$403.88
AgriGold Hybrids A6205Bt	96	17.4	229	$404.87
LG Seeds LG 2407 RR	90	17.5	229	$404.19
NK Brand N29-A2	92	17.5	229	$404.19
Garst 8880YG1	96	17.7	227	$399.29
Brownseed 3000 YGCB	90	17.3	227	$402.02
NK Brand N34-F1	94	17.9	227	$397.93
Crows 1695 B	92	17.3	226	$400.25
Pioneer Brand 38W22	93	17.5	226	$398.89
Gold Country Seed 92-01 CBR	92	17.4	225	$397.80
Garst 8921YG1/RR	92	17.6	224	$394.69
AGVENTURE AV 4880 CB	95	17.5	223	$393.60
Renk RK 452	94	17.7	223	$392.26
High Cycle by Trelay 4G721	96	17.7	223	$392.26
Pioneer Brand 37A92	97	17.4	221	$390.73
High Cycle by Trelay 7242	90	17.2	220	$390.28
Producers Hybrids 5154	91	17.5	219	$386.54
Golden Harvest H-6476 BT/RR	90	17.6	219	$385.88
Mycogen 2K350	93	17.0	218	$388.04
Kaltenberg K3735Bt	90	17.7	215	$378.19
LSD (P=0.10)		0.3	12	

Comparison of Long Season Corn Hybrids, 98 to 105 day relative maturity, at Lewiston and Waseca, Minnesota in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, and Jerry A. Tesmer.

The objective of these studies was to compare the performance of long season corn hybrids, 98 to 105 day relative maturity, in southern Minnesota. The trials were located at Lewiston 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 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 with grain weight and moisture recorded at all sites.

Formula for calculating gross economic return:
(Harvested bushels per acre times the dollar bushel revenues per acre of $1.84) minus drying cost per acre of ((grain moisture minus 15%) X (bushels per acre) X ($0.03)). In general, grain yield is still the best indicator of hybrid performance. However, grain moisture is important when looking at gross dollar return. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Field History for Long Season Corn Varieties Sites.

	Lewiston (Ted Olson Farm)	**Waseca**
Planting Date	May 3, 2005	May 3, 2005
Soil Type	Port Byron silt loam	Port Byron silt loam
Fertilizer (N-P-K)	Spring applied 150 lb/A nitrogen 46 lb/A phosphorus 60 lb/A potash	Fall applied 27 lb/A nitrogen 70 lb/A phosphorus 120 lb/A potash Spring applied 160 lb/A nitrogen as anhydrous ammonia
Herbicide Pre/Post	Lumax 3 qt/A	6 pt/A Lumax applied on May 4, 2005
Harvest Date	October 27, 2005	October 24, 2005
Tillage	Conventional tillage	Two pass with field cultivator on May 1, 2005
Previous Crop	Soybean	Soybean

Table 2. Corn hybrid grain yield (15.5%) and moisture content at Lewiston and Waseca, MN in 2005.

Entry Name	Description	Lewiston		Waseca		Ave	Ave
98 to 105 Day Relative Maturity	Day	Moisture (%)	Yield (Bu/A)	Moisture (%)	Yield (Bu/A)	Moisture (%)	Yield (Bu/A)
AgriGold Hybrids A6333	104	21.6	243	18.4	194	20.0	219
AgriGold Hybrids XA6502Bt RR	98	19.7	261	16.7	238	18.2	249
AGVENTURE AV 6230 CB	102	20.3	244	17.3	249	18.8	247
AGVENTURE X4406	100	20.2	240	17.0	270	18.6	255
Brownseed 5636	102	22.0	236	17.8	225	19.9	230
Croplan Genetics 421 RR/Bt	100	20.0	269	16.6	227	18.3	248
Croplan Genetics 491 Bt	102	20.0	255	16.6	248	18.3	251
Crows 2780 B	104	21.7	247	17.7	223	19.7	235
Crows 4S502	98	20.0	257	16.7	244	18.4	250
DeKalb DKC 50-20	100	20.3	265	16.6	248	18.5	257
DeKalb DKC 52-47	102	19.3	249	16.8	238	18.1	244
Dyna Gro DG 55P57	100	20.3	229	17.3	233	18.8	231
Dyna Gro DG55F43	104	22.3	250	18.4	244	20.4	247
Garst 8745YG1/RR	104	21.3	222	18.6	243	20.0	233
Garst 8876IT	101	20.1	229	17.0	235	18.6	232
Gold Country Seed 100-05 CB	100	19.9	236	17.0	246	18.5	241
Gold Country Seed 1016 RR Bt	104	19.6	233	16.5	243	18.1	238
Golden Harvest H-7287	100	19.1	237	16.5	231	17.8	234
Golden Harvest H-7567 Bt/RR	100	20.0	238	17.1	242	18.6	240
Golden Harvest H-7836 LL	102	22.7	210	18.1	210	20.4	210
High Cycle by Trelay 5B353	100	21.6	231	17.8	225	19.7	228
High Cycle by Trelay 5B739	105	21.9	241	18.1	257	20.0	249
Kaltenberg K4935Bt	98	19.2	239	16.3	223	17.8	231
Kaltenberg K5215Bt	102	21.5	248	17.5	264	19.5	256
LG Seeds LG 2491 BtRW	101	18.7	239	16.5	236	17.6	237
LG Seeds LG 2533	105	21.1	251	18.2	215	19.7	233
Mycogen 2E522	101	20.5	246	17.5	226	19.0	236
Mycogen 2J525	102	21.0	215	17.4	210	19.2	212
NK Brand 45-A6	101	18.9	243	16.1	247	17.5	245
NK Brand N36-R6	97	18.6	260	16.3	232	17.5	246
NK Brand N48-B1	103	20.8	232	17.5	206	19.2	219
Pioneer Brand 35A30	104	21.3	251	18.2	239	19.8	245
Pioneer Brand 37F73	99	19.7	243	16.6	227	18.2	235
Producers 6443	104	21.6	246	18.0	240	19.8	243
Renk RK 632	100	20.0	238	16.3	234	18.2	236
Renk RK 772	104	20.2	253	16.6	224	18.4	238
LSD (P=0.10)		**0.7**	**17**	**0.6**	**25**	**0.4**	**15**

Table 3. Average grain yield (15.5%), moisture, and economic return ranked by yield in 2005.

Entry Name	Description	Average Moisture	Average Yield	Gross Return
98 to 105 Day Relative Maturity	Day	(%)	(Bu/A)	Less drying
DeKalb DKC 50-20	100	18.5	257	$445.90
Kaltenberg K5215Bt	102	19.5	256	$436.48
AGVENTURE X4406	100	18.6	255	$441.66
Croplan Genetics 491 Bt	102	18.3	251	$436.99
Crows 4S502	98	18.4	250	$434.50
AgriGold Hybrids XA6502Bt RR	98	18.2	249	$434.26
High Cycle by Trelay 5B739	105	20.0	249	$420.81
Croplan Genetics 421 RR/Bt	100	18.3	248	$431.77
AGVENTURE AV 6230 CB	102	18.8	247	$426.32
Dyna Gro DG55F43	104	20.4	247	$414.47
NK Brand N36-R6	97	17.5	246	$434.19
NK Brand 45-A6	101	17.5	245	$432.43
Pioneer Brand 35A30	104	19.8	245	$415.52
DeKalb DKC 52-47	102	18.1	244	$426.27
Producers 6443	104	19.8	243	$412.13
Gold Country Seed 100-05 CB	100	18.5	241	$418.14
Golden Harvest H-7567 Bt/RR	100	18.6	240	$415.68
Gold Country Seed 1016 RR Bt	104	18.1	238	$415.79
Renk RK 772	104	18.4	238	$413.64
LG Seeds LG 2491 BtRW	101	17.6	237	$417.59
Mycogen 2E522	101	19.0	236	$405.92
Renk RK 632	100	18.2	236	$411.58
Crows 2780 B	104	19.7	235	$399.27
Pioneer Brand 37F73	99	18.2	235	$409.84
Golden Harvest H-7287	100	17.8	234	$410.90
Garst 8745YG1/RR	104	20.0	233	$393.77
LG Seeds LG 2533	105	19.7	233	$395.87
Garst 8876IT	101	18.6	232	$401.82
Dyna Gro DG 55P57	100	18.8	231	$398.71
Kaltenberg K4935Bt	98	17.8	231	$405.64
Brownseed 5636	102	19.9	230	$389.39
High Cycle by Trelay 5B353	100	19.7	228	$387.37
AgriGold Hybrids A6333	104	20.0	219	$370.11
NK Brand N48-B1	103	19.2	219	$375.37
Mycogen 2J525	102	19.2	212	$363.37
Golden Harvest H-7836 LL	102	20.4	210	$352.38
LDS (P=0.10)		**0.4**	**15**	

Comparison of Bt corn hybrids and their isolines at Potsdam, Rochester, and Waseca, Minnesota in 2005.

Breitenbach, Fritz R, Lisa M. Behnken, and Matthew M. White.

The objective of these studies was to compare Bt corn hybrids and their isolines in southern Minnesota. The trials were located at Potsdam, Rochester, 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 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 with grain weight and moisture recorded at all sites. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

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

	Potsdam	Rochester	Waseca
Planting Date	May 4, 2005	April 21, 2005	May 5, 2005
Soil Type	Port Byron Silt Loam	Lawler Loam Series	Nicollet or Webster clay loam
Fertilizer (N-P-K) **Spring App.**	144 lb/A nitrogen 23 lb/A phosphors 120 lb/A potash 24 lb/A sulfur	130 lb/A nitrogen 23 lb/A phosphors 90 lb/A potash 19 lb/A sulfur	Fall applied: 39 lb//A nitrogen 100 lb/A phosphorus 150 lb/A potash 160 lbs nitrogen/A as anhydrous ammonia
Herbicide Pre/Post	6 pt Lumax	6 pt Lumax	6pt Lumax
Harvest Date	October 31, 2005	October 26, 2005	October 24, 2005
Tillage	Field cultivated twice	Fall chiseled, spring disked & field cultivated	Two passes with field cultivator
Previous Crop	Soybean	Corn	Soybean

Table 2. Corn grain yield and moisture content of Bt hybrids and its isoline at Potsdam, Rochester, and Waseca, MN in 2005. (listed in pairs)

Entry Name	Description	Potsdam		Rochester		Waseca		Average Moisture (%)	Average yield (Bu/A)
	Day	Moisture (%)	Bu/A	Moisture (%)	Bu/A	Moisture (%)	Bu/A		
NK Brand N34-D6	94	20.6	219	19.0	143	19.7	207	19.8	190
NK Brand N34-F1	94 (YGCB-LL)	20.2	228	19.4	147	19.9	214	19.8	196
NK Brand 45-T5	101	19.9	227	18.6	117	19.6	213	19.4	186
NK Brand 45-A6	101 (YGCB-LL)	20.2	232	18.2	125	19.3	221	19.2	193
DeKalb DKC 4628	96 (RR2)	19.6	225	18.8	174	19.0	225	19.1	208
DeKalb DKC4710	96 (YGCB-RR2)	19.9	228	18.9	167	19.2	228	19.3	208
DeKalb DKC5145	101(RR2)	20.9	237	19.9	183	20.0	240	20.3	220
DeKalb DKC50-20	100 (YGCB-RR2)	21.3	241	20.5	198	20.2	228	20.7	222
Pioneer 37A91	97	19.7	211	19.0	161	19.6	215	19.4	196
Pioneer 37A92	97 (YGCB)	19.7	213	18.6	168	19.3	212	19.2	198
Pioneer 35Y65	105	22.6	246	21.8	196	22.5	213	22.3	218
Pioneer 35Y67	106 (HX1-LL)	22.9	242	21.1	180	22.2	203	22.1	208
LSD (P=0.10)		**0.7**	**11**	**0.5**	**18**	**0.5**	**9**	**-**	**7**

Table 3. European corn borer tunneling activity at Rochester, MN in 2005

Entry Name	Description	European Corn Borer Tunnels	Tunnel Length
	Day	Average Number/Plant	Average Millimeters/Plant
NK Brand N34-D6	94	0.4	19.4
NK Brand N34-F1	94 (YGCB-LL)	0.0	0.0
NK Brand 45-T5	101	0.6	27.1
NK Brand 45-A6	101 (YGCB-LL)	0.0	0.0
DeKalb DKC 4628	96 (RR2)	1.8	101.5
DeKalb DKC4710	96 (YGCB-RR2)	0.0	0.0
DeKalb DKC5145	101(RR2)	1.1	58.0
DeKalb DKC50-20	100 (YGCB-RR2)	0.0	0.0
Pioneer 37A91	97	0.7	36.3
Pioneer 37A92	97 (YGCB)	0.1	4.2
Pioneer 35Y65	105	0.5	13.9
Pioneer 35Y67	106 (HX1-LL)	0.0	0.0

Comparison of Waxy Corn Hybrids at Hope, Potsdam, and Waseca, Minnesota in 2005.

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

The objective of this study was to evaluate grain yield of waxy corn hybrids in southern Minnesota. The trials were located at Hope, Potsdam, 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 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 Potsdam and ten feet of the center two rows was hand harvested at Hope with grain weight and moisture recorded at all sites. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Field History for Waxy Corn Hybrid Research Sites.

	Hope	Potsdam	Waseca
Planting Date	May 24, 2005	May 4, 2005	May 5, 2005
Soil Type	Biscay loam	Port Byron silt loam	Port Byron silt loam
Fertilizer (N-P-K) Spring App.		144lb/A nitrogen 23 lb/A phosphorus 120 lb/A potash 24 lb/A sulfur	Fall applied 39 lb/A nitrogen 100 lb/A phosphorus 150 lb/A potash 160lb/A nitrogen as anhydrous ammonia, spring
Herbicide Pre/Post			6 pts Lumax on May 20, 2005
Harvest Date	October 18, 2005	October 31, 2005	October 20, 2005
Tillage	Conventional	Two pass with field cultivator	Two pass with field cultivator
Previous Crop	Soybean	Soybean	Soybean

Table 2. Waxy corn grain yields (15.5%) and moisture content at Hope, Potsdam, and Waseca, MN in 2005.

Entry Name	Description	Hope, MN		Potsdam, MN		Waseca, MN		Average	Average
	Day	% moisture	Bu/A	% moisture	Bu/A	% moisture	Bu/A	% moisture	Bu/A
AgriGold A6235 WX	99	15.5	185	21.3	184	24.5	185	20.4	185
AgriGold A6333 WX	105	20.0	191	23.8	210	24.1	203	22.6	201
AgriGold A6395 WX	108	19.3	223	23.5	200	18.8	164	20.5	196
Brown Seed 2900 WX	89	11.7	164	19.4	178	20.5	167	17.2	170
Brown Seed 4688 WX	95	15.4	174	20.9	193	23.7	179	20.0	182
Brown Seed 5130 WX	101	16.6	179	23.3	199	20.8	175	20.2	185
Gold Country 102 WX	102	14.7	191	21.4	204	22.3	177	19.5	191
Gold Country 105-02 WX	105	16.3	206	21.9	214	23.2	200	20.5	207
Gold Country 98-04 WX	98	14.8	190	21.3	193	21.2	180	19.1	188
Pioneer Brand 34G07 WX	110	18.6	195	24.4	211	-	-	-	-
Pioneer Brand 35Y68 WX	108	19.2	216	23.6	223	24.4	194	22.4	211
Pioneer Brand 36B06 WX	105	17.3	183	22.7	209	23.4	217	21.1	203
LSD (P=0.10)		**1.2**	**19**	**0.9**	**11**	**0.8**	**10**	**0.6**	**8**

VARIETY TRIALS

SOYBEAN

Comparison of early maturity Roundup Ready® soybean varieties, 1.3 to 1.8, at Potsdam, Spring Valley, and Waseca, Minnesota in 2005.

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

The objective of these studies was to compare the performance of early maturity Roundup Ready® soybean varieties, 1.3 to 1.8 maturities, in southern Minnesota. The trials were located at Potsdam, Spring Valley, 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 150,000 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 with grain weight and moisture recorded at all sites. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Field history for early maturity Roundup Ready® soybean variety trial.

	Potsdam	Spring Valley	Waseca
Planting Date	May 23, 2005	May 23, 2005	May 24, 2005
Soil Type	Port Byron silt loam	Kasson silt loam	Nicollet/Webster loam
Fertilizer Fall applied	None	None	27 lb/A nitrogen 70 lb/A phosphorus 120 lb/A potash
Herbicide Postemergence	Glyphosate	Glyphosate	Glyphosate
Harvest Date	October 14, 2005	October 7, 2005	October 15, 2005
Tillage	Conventional	Conventional	Conventional
Previous Crop	Corn	Corn	Corn

Table 2. Early maturity Roundup Ready® soybean yields (13%), moisture, oil and protein content at Potsdam, Spring Valley and Waseca, MN in 2005.

Entry Name	Description	Potsdam		Spring Valley		Waseca		Average		Average	
1.3 to 1.8 maturities	Maturity	% moisture	Bu/A	% moisture	Bu/A	% moisture	Bu/A	% moisture	Bu/A	% Oil	% Protein
Advantage ADV 1284 NR	1.3(SCN R3)	14.4	59	14.8	62	14.9	72	14.7	64	19.0	33.4
Asgrow 1603	1.6	14.0	55	14.2	56	13.9	57	14.0	56	18.5	36.0
Croplan Genetics RT1741	1.7	13.7	63	14.1	60	14.5	72	14.1	65	17.7	36.4
Crows 1515R	1.5	13.8	51	13.7	55	14.2	62	13.9	56	18.9	35.7
Crow 1830 R	1.8	13.4	66	13.8	61	14.3	70	13.8	66	18.8	35.5
Dairyland DSR-1500/RR-STS	1.5	13.7	57	14.1	59	14.3	69	14.0	61	18.4	35.5
DeKalb 15-51	1.5	13.1	54	13.7	57	14.1	68	13.6	59	19.4	32.1
Dyna Gro DG 33B17	1.7	13.2	60	13.8	61	13.9	73	13.6	65	18.3	35.1
Dyna Gro DG 31C15	1.5	13.1	60	14.0	59	13.8	77	13.6	65	18.3	34.2
Gutwein H-1516RR	1.5	14.2	58	14.5	59	14.2	68	14.3	62	18.9	35.2
Garst 1499RR	1.4	13.7	59	14.1	58	14.3	66	14.0	61	19.0	33.3
Garst 1827 RR/STS	1.8	13.6	58	14.1	56	14.3	69	14.0	61	18.2	36.6
Gold Country Seed 3615RR	1.5	13.6	60	14.2	58	14.2	72	14.0	63	18.9	34.5
Gold Country Seed 3618RR	1.8	13.6	62	14.4	62	14.1	74	14.0	66	18.7	34.6
Kruger K-149+RR	1.4	13.7	58	14.0	61	14.2	66	14.0	62	18.5	35.9
Kruger K-166RR/SCN	1.6(SCN)	12.8	55	13.7	56	14.2	69	13.6	60	18.8	36.1
Latham E1635R	1.6	13.0	58	13.9	60	14.4	71	13.8	63	18.5	35.6
Latham E1756R	1.7	13.4	60	13.8	62	14.3	72	13.8	65	18.8	34.7
Mallard RR 1512	1.5	13.6	60	14.2	61	14.3	71	14.0	64	18.5	35.9
NK Brand S14-K6	1.4	13.4	59	13.9	55	14.1	62	13.8	58	19.0	34.4
NK Brand S14-A7	1.4	13.4	55	13.9	58	13.9	73	13.7	62	19.4	33.5
Pioneer Brand 91M51	1.5	13.9	58	14.1	58	14.4	65	14.1	61	19.4	34.5
Pioneer Brand 91M60	1.6	13.1	50	14.0	54	14.4	67	13.8	57	19.4	33.9
Prairie Brand PB-1525RR	1.5	13.9	62	14.1	59	14.4	66	14.1	62	19.4	34.4
Prairie Brand PB-1725RR	1.7	13.4	62	13.9	64	14.1	72	13.8	66	18.7	34.5
Prairie Brand PB-1754	1.7	13.4	62	13.9	59	14.4	78	13.9	66	18.0	35.9
Producer Hybrids 163RR	1.6	13.4	59	14.0	58	14.3	69	13.9	62	18.7	35.7
Producers Hybrids PX 418RR	1.8	13.7	61	14.3	59	14.5	70	14.2	63	18.6	34.5
Profiseed 15T5	1.5	13.2	60	14.1	58	14.3	67	13.9	62	18.2	35.9
Renk 5C15R	1.5	13.5	59	14.2	61	14.7	66	14.1	62	19.2	34.5
Renk RS185RR	1.8	13.9	65	14.4	66	14.5	77	14.3	70	19.0	35.0
Sodak Genetics SD1151RR	1.5	13.7	51	14.0	54	14.7	65	14.1	57	18.9	36.2
Stine S-1300-4	1.3	13.8	62	14.2	61	14.7	69	14.2	64	18.9	34.7
High Cycle by Trelay 2183 RR	1.8	13.1	62	13.6	59	14.0	75	13.6	65	18.8	35.3
High Cycle by Trelay 2184 RR	1.8(SCN)	13.8	56	14.1	53	13.8	61	13.9	56	18.8	35.4
LSD (P=0.10)		**0.9**	**3.5**	**0.5**	**4**	**0.4**	**7**		**3**		

Table 3. Early maturity Roundup Ready® soybean yield (13%), moisture, oil, and protein content ranked by average yield in 2005.

Entry Name	Description	Average		Average	
1.3 to 1.8 maturities	Maturity	% moisture	Bu/A	% Oil	% Protein
Renk RS185RR	1.8	14.3	70	19.0	35.0
Crow 1830 R	1.8	13.8	66	18.8	35.5
Gold Country Seed 3618RR	1.8	14.0	66	18.7	34.6
Prairie Brand PB-1725RR	1.7	13.8	66	18.7	34.5
Prairie Brand PB-1754	1.7	13.9	66	18.0	35.9
Croplan Genetics RT1741	1.7	14.1	65	17.7	36.4
Dyna Gro DG 33B17	1.7	13.6	65	18.3	35.1
Dyna Gro DG 31C15	1.5	13.6	65	18.3	34.2
Latham E1756R	1.7	13.8	65	18.8	34.7
High Cycle by Trelay 2183 RR	1.8	13.6	65	18.8	35.3
Advantage ADV 1284 NR	1.3(SCN R3)	14.7	64	19.0	33.4
Mallard RR 1512	1.5	14.0	64	18.5	35.9
Stine S-1300-4	1.3	14.2	64	18.9	34.7
Gold Country Seed 3615RR	1.5	14.0	63	18.9	34.5
Latham E1635R	1.6	13.8	63	18.5	35.6
Producers Hybrids PX 418RR	1.8	14.2	63	18.6	34.5
Gutwein H-1516RR	1.5	14.3	62	18.9	35.2
Kruger K-149+RR	1.4	14.0	62	18.5	35.9
NK Brand S14-A7	1.4	13.7	62	19.4	33.5
Prairie Brand PB-1525RR	1.5	14.1	62	19.4	34.4
Producer Hybrids 163RR	1.6	13.9	62	18.7	35.7
Profiseed 15T5	1.5	13.9	62	18.2	35.9
Renk 5C15R	1.5	14.1	62	19.2	34.5
Dairyland DSR-1500/RR-STS	1.5	14.0	61	18.4	35.5
Garst 1499RR	1.4	14.0	61	19.0	33.3
Garst 1827 RR/STS	1.8	14.0	61	18.2	36.6
Pioneer Brand 91M51	1.5	14.1	61	19.4	34.5
Kruger K-166RR/SCN	1.6(SCN)	13.6	60	18.8	36.1
DeKalb 15-51	1.5	13.6	59	19.4	32.1
NK Brand S14-K6	1.4	13.8	58	19.0	34.4
Pioneer Brand 91M60	1.6	13.8	57	19.4	33.9
Sodak Genetics SD1151RR	1.5	14.1	57	18.9	36.2
Asgrow 1603	1.6	14.0	56	18.5	36.0
Crows 1515R	1.5	13.9	56	18.9	35.7
High Cycle by Trelay 2184 RR	1.8(SCN)	13.9	56	18.8	35.4
LSD (P=0.10)			3		

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

Brand Name	Variety	Maturity Rating	Hilum Color	Flower Color	Pubescence Color	Pod Color
Advantage	ADV 1284 NR	1.3	Tan	Purple	Grey	Tan
Asgrow	1603	1.6	Black	Purple	Lt. Tawny	Brown
Croplan Genetics	RT 1741	1.7	Brown	Pink	Lt. Tawny	Tan
Crows	1515R	1.5	Black	Purple	Tawny	Tan
Crows	1830R	1.8	Black	Purple	Tawny	Brown
Dairyland	DSR-1500/RR-STS	1.5	Black	White	Lt. Tawny	Brown
DeKalb	DKB 15-51	1.5	Brown	White	Tawny	Tan
Dyna Gro	DG32F12	1.2	Yellow	White	Grey	Tan
Dyna Gro	DG31C15	1.5	Tawny	White	Brown	Tan
Dyna Gro	DG 33B17	1.7		Purple	Lt. Tawny	
Garst	1499RR	1.4	Brown	Purple/ White	Lt. Tawny	Tan
Garst	1827RR/STS	1.8	Black	Purple	Lt. Tawny	Brown
Gold County Seed	3615RR	1.5	Black	Purple	Lt. Tawny	Tan
Gold County Seed	3618RR	1.8	Brown	Purple	Lt. Tawny	Brown
Gutwein	H-1516RR	1.5		Purple	Grey	
High Cycle by Trelay	2183RR	1.8	Black	White	Lt. Tawny	Brown
High Cycle by Trelay	2184RR/SCN	1.8	Imperfect Black	Purple	Grey	Tan
Kruger	K-149+RR	1.4	Brown	Purple	Lt. Tawny	Brown
Kruger	K-166RR/SCN	1.6	Black	Purple	Tawny	Brown
Latham	E1635R	1.6	Brown	Purple	Tawny	Brown
Latham	E1756R	1.7	Brown	Purple	Tawny	Tan
Mallard	1512RR	1.5		Purple	Lt. Tawny	
NK Brand	S14-K6	1.4	Black	Purple	Tawny	Tan
NK Brand	S14-A7	1.4	Imperfect Yellow	Purple	Tawny	Tan
Pioneer	91M51	1.5	Buff	Purple	Grey	Brown
Pioneer	91M60	1.6	Black	Purple	Tan	Brown
Prairie Brand	PB-1725RR	1.7	Brown	Purple	Tawny	Tan
Prairie Brand	PB-1525RR	1.5	Black	Purple	Tawny	Tan
Prairie Brand	PB-1754	1.7	Black	White	Lt. Tawny	Tan
Producers Hybrids	163RR	1.6	Brown	Purple	Lt. Tawny	Brown
Producers Hybrids	PX418RR	1.8	Brown	Purple	Lt. Tawny	Brown
Profiseed	15T5	1.5	Brown	Purple	Lt. Tawny	Brown
Renk	5C15R	1.5	Black	Purple	Lt. Tawny	Tan
Renk	RS185RR	1.8	Tan	White	Tawny	Tan
Sodak Genetics	SD1151RR	1.5		White	Grey	
Stine	S-1300-4	1.3	Brown	Purple	Lt. Tawny	
Stine	S-1636-4	1.6	Brown	Purple	Lt. Tawny	Brown

Comparison of late maturity Roundup Ready® soybean varieties, 1.9 to 2.5, at Potsdam, Spring Valley, and Waseca, Minnesota in 2005.

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The objective of these studies was to compare late maturity Roundup Ready® soybean varieties, 1.9 to 2.5, in southern Minnesota. The trials were located at Potsdam, Spring Valley, 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 150,000 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 with grain weight and moisture recorded at all sites. Field histories are listed in Table 1. Table 2 and 3 provide yield, moisture, oil and protein content of the varieties. Table 4 lists soybean variety traits. Table 5 and 6 provides the 2004 and 2003 trial results. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Field history for late maturity Roundup Ready soybeans variety trial.

	Potsdam	Spring Valley	Waseca
Planting Date	May 23, 2005	May 23, 2005	May 24, 2005
Soil Type	Port Byron silt loam	Kasson silt loam	Nicollet or Webster loam
Fertilizer (N-P-K) Fall applied	None	None	27 lb/A nitrogen 70 lb/A phosphorus 120 lb/A potash
Herbicide Post	Glyphosate	Glyphosate	Glyphosate
Harvest Date	October 14,2005	October 7, 2005	October 10-15, 2005
Tillage	Conventional	Conventional	Conventional
Previous Crop	Corn	Corn	Corn

Table 2. Late maturity Roundup Ready® soybean yields (13%), moisture, oil and protein content at Potsdam, Spring Valley and Waseca, MN in 2005.

Entry Name	Description	Potsdam		Spring Valley		Waseca		Average		Average	
1.9 to 2.5 maturities		% moist	Bu/A	% moist	Bu/A	% moist	Bu/A	% moist	Bu/A	% Oil	%Protein
Anderson 191 CNR	1.9(SCN)	12.3	66	13.3	58	13.9	73	13.2	66	18.7	35.6
Advantage ADV 2135R	2.1	12.6	61	13.4	59	13.9	74	13.3	65	18.8	33.9
Asgrow 1903	1.9	12.7	61	13.3	61	14.3	76	13.4	66	18.2	34.3
Asgrow 2107	2.1(SCN R3)	12.1	68	13.2	63	14.2	73	13.2	68	19.3	35.3
Atlas 5B193	1.9	12.6	61	13.4	62	14.2	73	13.4	65	18.3	35.0
Atlas 5N203	2(SCN R3, R14)	12.2	64	13.3	59	14.2	73	13.2	65	19.5	34.0
Croplan Genetics RT2092	2	12.3	63	13.3	64	13.9	76	13.2	68	18.6	35.2
Crows 2015R	2	12.4	66	13.3	60	14.3	81	13.3	69	18.9	35.2
Crows 2130R	2.1	12.8	62	13.3	60	14.1	75	13.4	66	18.2	35.6
Dairyland DSR-199/RR-STS	1.9	12.6	63	13.3	59	14.2	75	13.4	65	18.1	36.2
Dairyland DSR-2100/RR	2.1	12.4	64	13.4	63	14.3	76	13.4	68	18.1	36.1
Dyna Gro DG3190	1.9	12.4	64	13.4	61	14.2	74	13.3	66	18.2	35.0
Dyna Gro DG33X19	1.9	12.3	65	13.3	60	14.1	74	13.2	67	19.2	34.7
Gutwein H-1961 RR	1.9	12.7	68	13.5	63	14.2	77	13.5	69	18.7	34.7
Gutwein H-2448 RR	2.4	12.2	67	13.0	62	14.3	76	13.2	69	18.0	36.4
Garst 2018 RR	2	12.5	66	13.4	64	14.2	80	13.4	70	18.5	34.7
Garst 2560 RR	2.5	12.5	66	13.4	66	14.3	80	13.4	71	17.9	36.5
Gold Country Seed 1619 RR	1.9	12.4	63	13.3	62	14.3	70	13.3	65	17.8	36.1
Gold Country Seed 6221 RR	2.1	12.5	60	13.4	61	14.3	79	13.4	67	18.6	34.4
Kruger K-195+RR/SCN	1.9(SCN)	12.4	61	13.5	59	14.1	73	13.3	64	19.1	34.7
Kruger K-233+RR	2.3	12.6	65	13.3	62	13.9	75	13.3	67	18.2	34.1
Latham 1936RR Brand	1.9	12.6	60	13.5	61	14.0	77	13.4	66	18.4	34.7
Latham 497RR Brand	2.2	12.4	63	13.3	63	14.2	76	13.3	67	18.8	34.0
Latham L2336R Brand	2.3	12.6	65	13.4	60	14.0	75	13.3	67	18.2	36.3
NK Brand S19-R5	1.9	12.2	62	13.0	57	13.8	70	13.0	63	18.1	34.6
NK Brand S23-Z3	2.3	12.3	59	13.2	61	14.3	75	13.3	65	18.8	34.4
Pioneer Brand 92M32	2.3	12.4	61	13.4	61	14.3	75	13.4	66	18.5	34.3
Pioneer Brand 92M01	2(SCN PI 88788)	12.3	57	13.2	58	14.0	75	13.2	63	17.9	36.6
Prairie Brand PB-1954 RR	1.9	12.3	63	13.1	60	14.1	77	13.2	67	18.7	34.7
Prairie Brand PB-2345 RR	2.3(SCN)	12.4	62	13.3	60	14.4	76	13.4	66	18.1	35.7
Producers Hybrids 203N RR	2	12.6	70	13.8	60	14.0	79	13.5	70	19.2	34.4
Producers Hybrids 210 RR	2.1	12.5	62	13.5	64	14.0	80	13.3	68	18.4	34.6
Profiseed 4192	1.9	12.4	62	13.3	65	13.5	70	13.1	66	19.5	33.4
Profiseed 4215	2.1	12.4	60	13.3	63	14.0	77	13.2	66	18.5	34.1
Renk RS 199 RR	1.9	12.3	60	13.3	61	14.3	78	13.3	66	19.5	33.4
Renk RS 204N RR	2(SCN PI 88788)	12.3	66	13.3	58	14.3	78	13.3	67	19.5	34.0
Stine S-1918-4	1.9	12.5	63	13.4	60	14.1	80	13.3	67	18.6	34.8
Stine S2402-4	2.4	12.2	67	12.9	65	13.9	78	13.0	70	17.8	37.0
High Cycle by Trelay 2223RR	2.2	12.2	64	13.1	65	14.2	75	13.2	68	18.5	34.1
High Cycle by Trelay 2232RR	2.3	12.7	63	13.2	61	14.2	76	13.4	67	17.7	36.1
LSD (P=0.10)		0.4	3	0.3	5	0.5	7.5		3		

Table 3. Late maturity Roundup Ready® soybean yield (13%), moisture, oil, and protein content ranked by average yield in 2005.

Entry Name	Description	Average		Average	
1.9 to 2.5 maturities		% moisture	Bu/A	% Oil	% Protein
Garst 2560 RR	2.5	13.4	71	17.9	36.5
Garst 2018 RR	2	13.4	70	18.5	34.7
Producers Hybrids 203N RR	2	13.5	70	19.2	34.4
Stine S2402-4	2.4	13.0	70	17.8	37.0
Crows 2015 R	2	13.3	69	18.9	35.2
Gutwein H-1961 RR	1.9	13.5	69	18.7	34.7
Gutwein H-2448 RR	2.4	13.2	69	18.0	36.4
Asgrow 2107	2.1(SCN R3)	13.2	68	19.3	35.3
Croplan Genetics RT2092	2	13.2	68	18.6	35.2
Dairyland DSR-2100 / RR	2.1	13.4	68	18.1	36.1
Producers Hybrids 210 RR	2.1	13.3	68	18.4	34.6
High Cycle by Trelay 2223 RR	2.2	13.2	68	18.5	34.1
Dyna Gro DG33X19	1.9	13.2	67	19.2	34.7
Gold Country Seed 6221 RR	2.1	13.4	67	18.6	34.4
Kruger K-233+RR	2.3	13.3	67	18.2	34.1
Latham 497 RR Brand	2.2	13.3	67	18.8	34.0
Latham L2336 RR Brand	2.3	13.3	67	18.2	36.3
Prairie Brand PB-1954 RR	1.9	13.2	67	18.7	34.7
Renk RS 204N RR	2(SCN PI 88788)	13.3	67	19.5	34.0
Stine S-1918-4	1.9	13.3	67	18.6	34.8
High Cycle by Trelay 2232 RR	2.3	13.4	67	17.7	36.1
Anderson 191 CNR	1.9(SCN)	13.2	66	18.7	35.6
Asgrow 1903	1.9	13.4	66	18.2	34.3
Crows 2130R	2.1	13.4	66	18.2	35.6
Dyna Gro DG3190	1.9	13.3	66	18.2	35.0
Latham 1936RR Brand	1.9	13.4	66	18.4	34.7
Pioneer Brand 92M32	2.3	13.4	66	18.5	34.3
Prairie Brand PB-2345 RR	2.3(SCN)	13.4	66	18.1	35.7
Profiseed 4192	1.9	13.1	66	19.5	33.4
Profiseed 4215	2.1	13.2	66	18.5	34.1
Renk RS 199 RR	1.9	13.3	66	19.5	33.4
Advantage ADV 2135R	2.1	13.3	65	18.8	33.9
Atlas 5B193	1.9	13.4	65	18.3	35.0
Atlas 5N203	2(SCN R3, R14)	13.2	65	19.5	34.0
Dairyland DSR-199/RR-STS	1.9	13.4	65	18.1	36.2
Gold Country Seed 1619 RR	1.9	13.3	65	17.8	36.1
NK Brand S23-Z3	2.3	13.3	65	18.8	34.4
Kruger K-195+RR/SCN	1.9(SCN)	13.3	64	19.1	34.7
NK Brand S19-R5	1.9	13.0	63	18.1	34.6
Pioneer Brand 92M01	2(SCN PI 88788)	13.2	63	17.9	36.6
LSD (P=0.10)			3		

Table 4. Traits of late maturity Roundup Ready® soybean varieties.

Brand Name	Variety	Maturity Rating	Hilum Color	Flower Color	Pubescence Color	Pod Color
Advantage	ADV2135	2.1		White	Gray	
Anderson	191CNR	1.9		Purple	Lt. Tawny	
Asgrow	1903	1.9	Gray	White	Gray	Tan
Asgrow	2107	2.1	Imperfect Black	Purple	Gray	Brown
Atlas	5B193	1.9	Tan	White	Tawny	Tan
Atlas	5N203	2	Imperfect Black	Purple	Gray	Tan
Croplan Genetics	RT2092	2	Tan	White	Tawny	Tan
Crows	2015R	2	Black	Purple	Gray	Tan
Crows	2130R	2.1	Tan	White	Tawny	Tan
Dairyland	DST-199/RR-STS	1.9	Black	White	Lt. Tawny	Brown
Dairyland	DSR-2100/RR	2.1	Black	White	Lt. Tawny	Tan
Dyna Gro	DG3190	1.9	Brown	White	Tawny	Tan
Dyna Gro	DG36N23	2.3	Tawny	White	Brown	Tan
Dyna Gro	DG33X19	1.9		Purple	Lt. Tawny	
Fastart	F-19H1RR	1.9	Brown	White	Lt. Tawny	Tan
Fastart	F-24H8RR	2.4	Black		Lt. Tawny	
Garst	2018RR	2	Brown	White	Lite Tawny	Tan
Garst	2560RR	2.5	Imperfect Black	Purple	Gray	Tan
Gold County Seed	1619RR	1.9	Black	White	Lt. Tawny	SEG
Gold County Seed	6221RR	2	Brown	White	Lt. Tawny	Tan
Gutwein	H-1961RR	1.9		White	Brown	
Gutwein	H-2448RR	2.4		Purple	Lt. Tawny	
High Cycle by Trelay	2223RR	2.2	Brown	White	Tawny	Tan
High Cycle by Trelay	2232RR	2.3	Black	Purple	Lt. Tawny	Tan
Kruger	K-195+RR/SCN	1.9	Imperfect Black	Purple	Gray	Tan
Kruger	K-233+RR	2.3	Black	Mixed	Lt. Tawny	Brown
Latham	497RR	2.2	Brown	White	Lt. Tawny	Tan
Latham	L2336R	2.3	Black	Mixed	Lt. Tawny	Brown
Latham	1936RR	1.9	Black	White	Tawny	Tan
NK Brand	S19-R5	1.9	Black	Purple	Tawny	Tan
NK Brand	S23-Z3	2.3	Black	White	Lt. Tawny	Tan
Pioneer	92M32	2.3	Brown	White	Lt. Tawny	Tan
Pioneer	92M01	2	Brown	Purple	Lt. Tawny	Brown
Prairie Brand	PB-1954RR	1.9	Brown	Purple	Lt. Tawny	Tan
Prairie Brand	PB-2345RR	2.3	Buff	Purple	Gray	Brown
Producers Hybrid	203NRR	2	Imperfect Black	Purple	Gray	Tan
Producers Hybrid	210RR	2.1	Brown	White	Lt. Tawny	Tan
Profiseed	4192	1.9	BR	White	Tawny	Tan
Profiseed	4215	2.1	BL	White	Tawny	Tan
Renk	RS199RR	1.9	Black	Purple	Tawny	Tan
Renk	RS204NRR	2	Imperfect Black	Purple	Gray	Tan
Stine	S-1918-4	1.9	Tan	White	Tawny	
Stine	S-2402-4	2.4	Black	Purple	Lt. Tawny	Brown

Table 5. 2004 Roundup Ready Soybean Variety Trial Results for LeSueur/Rice, Olmsted/Wabasha, Fillmore/Mower, and Waseca

		LeSueur/ Rice	Olmsted/ Wabasha	Fillmore/ Mower	Waseca	AVE		
Entry Name	Description	Bu/A	Bu/A	Bu/A	Bu/A	4 Sites	% Oil	% Protein
Latham 497RR	Top Performer in 2003	53.6	54.3	50.0	56.9	53.7	17.9	35.1
ProfiSeed 4192 RR	1.9	53.0	51.8	47.4	62.8	53.7	19.0	33.9
Gold Country Seed 6221 RR	Top Performer in 2003	52.3	51.8	50.2	52.0	51.6	17.9	34.7
Gold Country Seed 1319 RR	1.9	47.3	51.7	48.4	57.1	51.1	17.0	37.7
DynaGro DG3218	2.1	48.3	52.6	50.1	51.9	50.7	17.4	37.3
Producers Hybrids 210 RR	Top Performer 2003	49.2	50.4	50.6	52.4	50.7	18.3	34.9
Latham E1936R	1.9	51.0	52.9	48.4	49.9	50.5	18.0	35.8
Asgrow AG1903	1.9	49.0	48.5	49.1	55.6	50.5	17.6	35.5
Gold Country Seed 2424 RR	2.4	51.6	54.8	49.8	43.8	50.0	17.5	37.4
Producers Hybrids PX 320 RR	2	54.0	51	45.9	48.7	49.9	18.6	35.4
ProfiSeed 4215 RR	Top Performer 2003 & 2002	48.5	51.8	48.2	50.2	49.7	18.3	34.6
Prairie Brand PB-2141 RR	2.1 Top Performer in 2003 & 2002	49.7	50.1	48.0	50.4	49.6	18.0	35.1
Latham L2136R	2.1 Top Performer in 2003 (EX468)	50.5	50.5	44.4	52.5	49.5	17.8	36.4
Trelay High Cycle 2223 RR	2.2	52.8	48.4	49.6	46.9	49.4	18.5	34.4
Stine S-2103-4	2.1	45.8	47.4	50.2	53.8	49.3	18.2	35.0
DynaGro DG3200	2	47.5	48.4	45.4	55.3	49.2	17.4	36.2
NK Brand S19-R5	1.9	51.9	48	45.3	50.7	49.0	17.8	36.0
Atlas 5B190RR	1.9	50.4	54	46.6	43.8	48.7	17.5	37.3
DeKalb DKB15-51	1.5	42.5	44.4	47.9	59.8	48.6	17.8	35.6
Gold Country Seed 2519 RR	1.9	45.8	47.3	47.7	53.6	48.6	17.9	35.8
Prairie Brand PB-1914 RR	1.9	50.1	46.4	45.6	52.2	48.6	17.4	36.3
NK Brand S17-P9	1.7	48.4	49.5	45.5	50.9	48.6	17.4	35.1
Asgrow AG2107	2.1 SCN	48.1	48.5	46.8	50.4	48.4	18.5	35.9
Golden Harvest H-2448 RR	2.4	47.5	50.9	50.9	43.9	48.3	17.7	37.0
ProfiSeed 22J1 RR	2.1	47.4	46.7	48.2	50.6	48.2	17.7	36.5
Prairie Brand PB-1954 RR	1.9	47.6	52.1	47.7	45.3	48.2	18.1	36.0
Trelay High Cycle 2194 RR	1.9	50.3	48.6	47.1	46.3	48.1	17.0	37.3
Pioneer 92B38	2.3	50.9	48.6	46.3	45.1	47.7	17.5	37.2
Garst 2018 RR	2	46.5	49.3	46.8	48.0	47.7	17.8	36.2
Garst 2012 RR/N	2.0 SCN	46.7	49.2	42.1	52.5	47.6	17.9	38.1
Trelay High Cycle 2222 RR	2.2	44.8	50.5	44.1	50.6	47.5	17.7	36.4
Stine S-2116-4	2.1	48.9	46.2	44.3	50.5	47.5	17.4	36.1
Crows 2015 R	2	48.5	51.2	48.6	41.6	47.5	18.6	35.1

2004 Results continued		LeSueur/ Rice	Olmsted/ Wabasha	Fillmore/ Mower	Waseca	AVE		
Entry Name	Description	Bu/A	Bu/A	Bu/A	Bu/A	4 Sites	% Oil	% Protein
Golden Harvest H-2124 RR	2.1	45.6	53.6	46.8	42.8	47.2	17.3	37.4
Golden Harvest H-1961 RR	Top Performer in 2003 & 2002	48.2	46.5	44.3	49.0	47.0	17.5	36.0
Croplan Genetics RT2092	2	44.4	43.7	46.6	53.3	47.0	17.6	36.1
Garst 2332 RR	2.3	45.3	52	45.0	44.5	46.7	17.3	37.9
Atlas 2N202RR	2	48.5	46.4	49.0	42.5	46.6	18.5	35.5
Crows 1830 R	1.8	51.1	47.6	45.5	42.2	46.6	18.3	36.3
Crows 2130 R	2.1	43.9	46.2	42.8	51.5	46.1	17.5	36.4
DynaGro DG3190	Top Performer in 2003	46.6	46.2	43.7	47.6	46.0	17.8	35.8
Asgrow AG2403	2.4	52.2	44.3	48.2	39.3	46.0	18.2	35.7
Stine S-1918-4	Top Performer 2003	46.3	46.8	42.7	47.0	45.7	17.7	36.1
Producers Hybrids PX 322 RR	2.2	46.5	43.8	42.3	49.8	45.6	17.6	36.4
Prairie Brand PB-2243 RR	2.2	45.2	46.8	42.8	47.4	45.5	17.1	37.7
Dekalb DKB 22-52	2.2 STATEWIDE CHECK Top Performer in 2003	43.4	41.5	45.3	51.9	45.5	17.9	35.9
Latham 367RR	1.9	47.8	47.7	40.3	45.7	45.4	17.7	35.6
DynaGro DG31C15	1.5	43.8	42.1	42.6	52.4	45.2	17.7	36.3
Pioneer 92M00	2	45.6	45.4	46.1	42.4	44.9	17.8	36.5
Crows 1530 R	1.5	50.6	42.4	43.8	42.6	44.9	17.5	37.6
Trelay High Cycle 2175 RR	1.7	46.1	41.1	40.7	50.6	44.6	17.7	36.3
NK Brand S14-A7	1.4	46.0	43.1	43.1	45.8	44.5	17.9	36.0
Pioneer 92M30	2.3	47.5	47.1	43.6	36.2	43.6	17.9	36.3
Stine S-1586-4	1.6	44.4	41.8	41.8	43.8	42.9	17.9	35.9
NK Brand S21-H3	2.1	43.9	46.2	39.8	36.9	41.7	17.4	37.4
Croplan Genetics RT1535	1.5	43.9	43.1	40.3	39.4	41.7	17.9	35.8
	LSD (0.10)	5.7	4.3	4.8	9.8	3.2		

Table 6. 2003 Roundup Ready Soybean Variety Trial Results for Houston, Potsdam, Sargent and Waseca (Breitenbach, Behnken, Naeve).

Variety	Maturity Group	Houston Bu/A	Potsdam Bu/A	Sargeant Bu/A	Waseca Bu/A	Ave. Yield
DeKalb 22-51	**2.2**	**35.3**	**49.7**	**39.7**	**37.9**	**40.6**
ProfiSeed 4215	**2.1**	**36.1**	**49.8**	**39.5**	**36.5**	**40.5**
Prairie Brand 2141	**2.1**	**34.1**	**48.0**	**43.6**	**36.2**	**40.5**
ProfiSeed 4214	**2.1**	**36.1**	**48.7**	**37.3**	**39.0**	**40.3**
Gold Country 6221 RR	**2.1**	**35.3**	**48.2**	**41.3**	**36.2**	**40.2**
Golden Harvest H-1961	**1.9**	**37.1**	**49.4**	**35.8**	**36.2**	**39.6**
Latham 497 RR	**2.2**	**35.3**	**47.3**	**40.3**	**35.3**	**39.5**
Thompson T-7214RR	**2.1**	**36.8**	**48.3**	**39.2**	**32.7**	**39.3**
Latham 468 RR	**2.1**	**35.9**	**50.1**	**34.7**	**35.6**	**39.1**
Producers 210 RR	**2.1**	**35.5**	**45.7**	**39.2**	**35.7**	**39.0**
Dynagro 3190	**1.9**	**37.1**	**47.4**	**36.3**	**34.6**	**38.9**
Stine 1918-4 RR	**1.9**	**35.6**	**47.9**	**36.4**	**35.3**	**38.8**
Trelay High Cycle 2212 RR	2.1	35.9	46.6	38.4	33.0	38.5
Latham 367 RR	1.9	35.3	47.9	34.8	33.9	38.0
Thompson T-7205RR	2	33.8	44.7	37.9	35.8	38.0
Asgrow 2107	2.1	31.9	48.4	37.2	34.2	37.9
Profiseed 4192	1.9	32.9	45.2	37.0	36.6	37.9
Stine 1586-4 RR	1.5	34.2	47.1	34.1	34.3	37.4
DeKalb 15-51	1.5	34.3	44.3	35.6	34.8	37.3
NK Brand X317R	1.7	32.6	45.6	36.5	34.6	37.3
Pioneer 92B38	2.3	33.2	44.6	35.5	35.0	37.1
Ziller BT213 RR	2.1	31.9	46.0	37.2	32.9	37.0
Golden Harvest 2124 RR	2.1	32.4	43.4	38.0	33.7	36.9
NK Brand S19-V2	1.9	33.4	47.9	33.7	31.5	36.6
Pioneer 92B13	2.1	34.7	47.0	33.7	29.9	36.3
Trelay High Cycle 2210 RR	2	34.2	43.7	31.9	33.3	35.8
Thompson T- 7192RR	1.9	33.0	42.6	34.1	32.7	35.6
Gold Country 1319 RR	1.9	35.0	41.6	33.3	31.4	35.3
Gold Country 7414 RR	1.4	32.2	43.8	34.0	29.7	34.9
Renk RS 212	2.1	29.1	44.6	34.3	30.8	34.7
Pioneer 92M00	2	30.0	41.3	36.1	28.1	33.8
Stine 1962-4 RR	1.6	29.6	40.3	32.8	28.1	32.7
NK Brand S21-D2	2.1	28.7	38.8	33.5	28.7	32.4
Producers 171 RR	1.7	28.6	40.3	32.1	28.1	32.3
Pioneer 91B03	1.0	31.1	35.9	29.8	31.2	32.0
Trelay High Cycle 2182 RR	1.8	26.9	38.4	31.3	27.9	31.1
	LSD (0.10)	**2.5**	**3.1**	**4.8**	**3.7**	**1.8**

Short season Roundup Ready® soybean varieties, 0.5 to 1.3, simulating soybeans grown after cannery peas at Potsdam and Waseca, MN in 2005.

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

Currently more than 80,000 acres of peas are planted in southern MN, of which approximately 40,000 acres are double cropped with short season soybean. Minimal variety testing information is available to growers. Two trials were initiated in southern Minnesota in 2005, one located in Waseca, and the other in Potsdam. Field histories are presented in Table 1. Table 2 and 3 provide information on yield, oil, and protein levels of short season Roundup Ready® soybean varieties. Table 4 provides details on soybean variety characteristics. Table 5 lists the results of the 2004 short season trial. (University of Minnesota Extension Service, Regional Center, Rochester, and Southern Research and Outreach Center, Waseca, MN).

Table 1. 2005 Field histories for short season Roundup Ready® soybean variety trials

	Potsdam	Waseca
Soil Type	Port Byron silt loam	Nicollet/Webster clay loam
Herbicide	Glyphosate	Glyphosate
Planting Date	June 23, 2005	June 24, 2005
Tillage	Conventional	Conventional
Previous Crop	Corn	Corn
Harvest Date	October 15, 2005	October 12, 2005

Table 2. Grain yield (13%), moisture content, oil and protein content of short season Roundup Ready® soybean varieties simulating soybeans grown after cannery peas at Potsdam and Waseca, MN in 2005.

Entry Name	Description	Potsdam		Waseca		2 Site Average		Average	
0.5 to 1.3 maturities		% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% oil	% protein
Asgrow 0801	0.8	12.3	45	14.3	54	13.3	49	17.7	35.5
Asgrow 1102	1.1	13.8	47	13.6	54	13.7	51	19.7	35.0
Dairyland DSR-09-002/RR-STS	0.9	12.9	45	13.8	52	13.4	48	18.1	35.7
Dairyland DSR 0501/RR-STS	0.5	12.1	42	14.0	41	13.1	41	18.0	36.1
DeKalb 07-52	0.7	12.4	41	14.0	50	13.2	46	17.1	35.8
Gold Country Seed 2509 RR	0.9	12.5	51	14.1	53	13.3	52	17.7	35.8
Gold Country Seed 2605 RR	0.5	12.2	52	14.0	52	13.1	52	17.6	35.0
Gold Country Seed 3512	1.2	13.3	47	14.6	54	14.0	51	18.1	34.1
Gutwein H-0537	0.5	12.6	50	13.9	45	13.3	47	17.7	36.7
Kruger K-098RRR	0.9	12.3	53	14.2	55	13.3	54	17.5	36.1
Kruger K-100RR	1.0	12.5	50	14.0	57	13.3	53	18.3	35.6
Kruger K-122RR	1.2	12.6	54	13.4	52	13.0	53	17.7	36.4
Latham E1330R	1.3(SCN PI-188788)	13.1	51	15.1	54	14.1	53	17.6	34.0
NK Brand S08-C3	0.8	12.3	44	14.0	44	13.2	44	18.0	34.4
Pioneer Brand 90M60	0.6	12.3	41	13.4	47	12.9	44	17.6	35.9
Pioneer Brand 90M91	0.9	12.3	43	14.5	52	13.4	48	18.0	36.1
Pioneer Brand 91M13	1.1	12.3	48	14.1	51	13.2	49	18.7	36.1
Renk RS052RR	0.5	12.2	48	13.8	45	13.0	47	18.2	36.5
Renk RS 095RR	0.9	12.7	47	13.6	53	13.2	50	16.9	36.7
Sodak Genetics SD1092RR	1.0	12.5	45	13.5	52	13.0	48	17.8	36.7
Stine S-0943-4	1.0	12.4	49	14.1	55	13.3	52	17.7	36.1
Stine S-1300-4	1.3	12.4	51	13.9	54	13.2	53	17.8	35.1
NK Brand 210-T1	1.0	12.6	46	13.8	50	13.2	48	17.2	35.6
NK Brand S08-R4	0.8	12.3	49	13.2	49	12.8	49	17.2	35.5
LSD (0.10)		0.4	6	0.7	5		4		

Table 3. Average grain yield (13%), moisture content, oil and protein content of short season Roundup Ready® soybean varieties simulating soybeans grown after cannery peas, ranked by yield in 2005.

Entry Name	Description	2 Site Average		Average	
0.5 to 1.3 maturities		% moisture	bu/A	% oil	% protein
Kruger K-098RRR	0.9	13.3	54	17.5	36.1
Kruger K-100RR	1.0	13.3	53	18.3	35.6
Kruger K-122RR	1.2	13.0	53	17.7	36.4
Latham E1330R	1.3(SCN PI-188788)	14.1	53	17.6	34.0
Stine S-1300-4	1.3	13.2	53	17.8	35.1
Gold Country Seed 2509 RR	0.9	13.3	52	17.7	35.8
Gold Country Seed 2605 RR	0.5	13.1	52	17.6	35.0
Stine S-0943-4	1.0	13.3	52	17.7	36.1
Asgrow 1102	1.1	13.7	51	19.7	35.0
Gold Country Seed 3512	1.2	14.0	51	18.1	34.1
Renk RS 095RR	0.9	13.2	50	16.9	36.7
Asgrow 0801	0.8	13.3	49	17.7	35.5
Pioneer Brand 91M13	1.1	13.2	49	18.7	36.1
NK Brand S08-R4	0.8	12.8	49	17.2	35.5
Dairyland DSR-09-002/RR-STS	0.9	13.4	48	18.1	35.7
Pioneer Brand 90M91	0.9	13.4	48	18.0	36.1
Sodak Genetics SD1092RR	1.0	13.0	48	17.8	36.7
NK Brand 210-T1	1.0	13.2	48	17.2	35.6
Gutwein H-0537	0.5	13.3	47	17.7	36.7
Renk RS052RR	0.5	13.0	47	18.2	36.5
DeKalb 07-52	0.7	13.2	46	17.1	35.8
NK Brand S08-C3	0.8	13.2	44	18.0	34.4
Pioneer Brand 90M60	0.6	12.9	44	17.6	35.9
Dairyland DSR 0501/RR-STS	0.5	13.1	41	18.0	36.1
LSD (0.10)			4		

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

Brand Name	Variety	Maturity Rating	Hilum Color	Flower Color	Pubescence Color	Pod Color
Asgrow	801	0.8	Black	Purple	Tan	Brown
Asgrow	1102	1.1	Black	Purple	Tan	Brown
Dairyland	DSR-0902/RR-STS	0.9		Purple	Tawny	
Dairyland	DSR 0501/RR-STS	0.5	Black	-	Lt. Tawny	Brown
DeKalb	DKB 07-52	0.7	Brown	Purple	Lt. Tawny	Tan
Gold Country Seed	2509RR	0.9	Brown	Purple	Lt. Tawny	Brown
Gold Country Seed	2605RR	0.5	Yellow	Purple	Lt. Tawny	Tan
Gold Country Seed	3512RR	1.2	Tan	Purple	Gray	Tan
Gutwein H-0537	H-0537	0.5		Purple	Brown	
Kruger	K-098RR	0.9	Brown	Purple	Lt. Tawny	Brown
Kruger	K-100RR	1	Brown	Purple	Lt. Tawny	Brown
Kruger	K-122RR	1.2	Black	Purple	Lt. Tawny	Brown
Latham	E1330R	1.3	Brown	Purple	Gray	Tan
NK Brand	S08-C3	0.8	Gray	Purple	Gray	Brown
NK Brand 210-T1	210-T1	1	Gray	White	Tawny	Tan
NK Brand S08-R4	S08-R4	0.8	Gray	White	Tawny	Tan
Pioneer	90M60	0.6	Brown	Purple	Tawny	Brown
Pioneer	90M91	0.9	Brown	Purple	Tawny	Tan
Pioneer	91M13	1.1	Brown	Purple	Tawny	Tan
Renk	RS052RR	0.5	Brown	White	Tawny	Tan
Renk	RS095RR	0.9	Brown	White	Lt. Tawny	Brown
Sodak Genetics	SD1092RR	1		Purple	Lt. Tawny	
Stine	S-0943-4	1	Brown	Purple	Lt. Tawny	Brown
Stine	S-1300-4	1.3	Brown	Purple	Lt. Tawny	Brown

Table 5. Grain yield moisture content oil and protein content of short season Roundup Ready soybean varieties simulating soybeans grown after cannery peas at Potsdam and Waseca, MN in 2004 (Breitenbach, Behnken, and Naeve).

		POTSDAM		WASECA		AVERAGE	POTSDAM	
Entry Name	Description	% Moisture	bu/A	% Moisture	bu/A	bu/A	% Oil	% Protein
NK Brand S08-R4	0.8	16.8	38.9	16.9	52.0	45.5	17.2	35.9
NK Brand S10-T1	1.0	18.3	40.1	19.5	49.2	44.7	17.9	35.6
Gold Country Seed 2509 RR	0.9	18.1	33.6	19.8	55.5	44.5	17.6	37.0
Stine S-0943-4	0.9	16.9	33.1	18.8	54.0	43.5	17.2	36.7
Asgrow AG0801 RR	0.8 STATEWIDE CHECK	17.2	33.5	17.2	52.2	42.9	17.6	36.7
Stine S-0990-4	1.0	17.4	34.0	19.0	51.2	42.6	17.0	38.5
DeKalb DKB0752	0.7	16.9	34.7	16.7	47.6	41.1	17.3	36.9
Latham 148RR	1.4	17.8	33.2	17.5	46.3	39.8	17.3	37.2
Latham E1330R	1.3	18.8	27.5	18.5	50.3	38.9	16.7	36.8
Pioneer 91B33	1.3	17.9	32.8	18.3	45.1	38.9	18.2	36.5
Stine S-1007-4	1.0	16.7	30.0	19.1	46.2	38.1	17.4	37.3
ProfiSeed 4153 RR	1.5	19.1	27.3	20.0	48.3	37.8	16.5	38.8
Latham E1230R	1.2	18.5	27.2	18.3	48.1	37.7	16.8	37.5
ProfiSeed 13J6 RR	1.3	17.6	28.1	19.8	45.2	36.6	17.4	38.1
Gold Country Seed 3512 RR	1.1	18.3	26.7	19.3	42.6	34.7	16.7	37.4
Gold Country Seed 6016 RR	1.4	19.2	21.8	20.0	45.5	33.7	16.6	37.1
	LSD (0.10)	1.0	5.4	1.6	7.8	4.7		

Value-Added Soybean Trial at Hope, Potsdam, and Waseca, MN in 2005

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

Interest and demand for soybeans grown for human consumption and other specific purposes has been increasing every year. Specialty or value-added soybeans are used in many different markets and can be grown conventionally, organically, or produced and designated as "chemical-free." Producers can realize added 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 realize a premium for their efforts. SE Minnesota has several market outlets for some of these varieties. 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. While some producers grow special use beans without a contract, there is always a risk that you won't be able to sell these at a premium.

Agronomic information about the adaptability of these "value-added" 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 southeastern Minnesota for special use markets. Trials were conducted in Hope, Potsdam and Waseca in 2005. A randomized complete block design with four replications was used. Plots were 10 feet wide by 25 feet and trimmed to a uniform harvest length prior to combining. The center rows of each plot were harvested to determine yield. Table 2. lists key traits that some varieties are grown for. Soybean yields for Hope, Potsdam and Waseca are reported individually and averaged across locations in Table 3. Soybean oil and protein were also measured. (University of Minnesota Extension Service, Regional Center, Rochester, and Southern Research and Outreach Center, Waseca).

Table 1. Field history for value added soybean trials.

	Hope	Potsdam	Waseca
Soil Type	Clarion loam	Port Byron silt loam	Nicollet/Webster clay loam
Planting Date	May 24, 2005	May 23, 2005	May 31, 2005
Row Spacing	30-inch	30-inch	10-inch
Population	150,000 seeds/A	150,000 seeds/A	150,000 seeds/A
Herbicide	Preemergence: Gangster	Preemergence: Domain Postemergence: Raptor + FirstRate + Select	Preplant: Pursuit + Trust Postemergence: Basagran + Poast + COC
Tillage	Conventional	Conventional	Field cultivated prior to herbicide application Field cultivated twice to incorporate chemical
Previous Crop	Corn	Corn	Corn
Harvested	October 19, 2005	October 17, 2005	October 10, 2005

Table 2. Characteristics of selected special use soybean varieties (in progress)

Variety: Kin **Maturity Rating:** 1.9 **Variety Highlights:** Yellow hilum soybean variety for use in various food products
Variety: Lariat **Maturity Rating:** 1.6 **Variety Highlights:** Yellow hilum soybean variety for use in various food products
Variety: Vinton 81 **Maturity Rating:** 2.1-2.2 **Variety Highlights:** Yellow hilum, high protein, large seeded soybean variety for use in various food products
Variety: IA2016 **Maturity Rating:** 2.2 **Variety Highlights:** Yellow hilum, high protein large, seeded soybean variety for use in various food products (tofu)
Variety: IA2053 **Maturity Rating:** 2.3 **Variety Highlights:** Large seeded, high protein, yellow hilum soybean for use in various food products (tofu)

Table 3. Soybean yield (13%), moisture, protein, and oil concentration of value-added varieties at Hope, Potsdam, and Waseca, MN in 2005

Entry	Maturity	Hope		Potsdam		Waseca		3 Site Average			
		% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% Oil	% Protein
Vinton 81	2.1	11.0	43	12.7	41	14.6	60	12.8	48	16.6	38.9
SRN-14		10.5	40	11.6	44	12.6	56	11.6	47	17.6	38.0
SR-110		10.3	46	11.5	54	12.9	63	11.7	54	16.6	36.6
SR-53		10.3	46	10.9	52	12.9	66	11.3	55	16.8	38.5
SR-67		10.4	49	11.0	55	13.0	64	11.5	56	17.3	38.4
SR-11		10.7	47	12.1	52	14.1	65	12.3	55	18.3	36.3
SR-42 LF		11.0	49	11.6	52	13.3	62	12.0	54	17.2	37.6
Lariat		10.2	46	10.9	56	13.6	67	11.6	57	19.1	36.0
Kin		10.6	54	11.0	53	12.8	63	11.5	56	19.8	35.4
Syngenta NK S20-FS	2.0	10.7	51	10.8	61	12.7	74	11.4	62	18.4	34.4
Syngenta NK S18-N5	1.8	10.5	60	11.1	61	13.5	68	11.7	63	17.8	35.5
Stine 1906	1.9	10.1	53	10.6	58	12.1	70	10.9	60	18.5	34.8
Stine 2686	2.6	10.1	56	10.6	61	12.8	68	11.2	62	18.9	35.2
Stine 1700-6	1.7	10.7	55	10.7	61	12.6	75	11.3	64	18.5	34.7
Stine 2100-0	2.0	10.4	57	10.8	62	12.8	77	11.3	65	19.4	35.6
Gold Country 3514 FG	1.4	10.4	39	11.2	47	11.9	58	11.2	48	17.2	38.6
Gold Country Exp3720	2.0	10.2	54	11.6	60	13.4	70	11.7	61	18.3	36.7
Northland S&G Surepro	1.9	10.8	48	12.2	49	13.0	60	12.0	52	16.8	39.6
Northland S&G Royalpro	1.6	10.7	42	11.3	47	11.7	57	11.2	49	17.0	38.6
Northland S&G Soyapro	1.6	10.7	40	12.2	44	12.9	56	11.9	47	16.8	38.4
Latham Brand 323	2.2	10.8	46	11.7	47	13.4	65	12.0	53	21.1	39.6
Latham Brand 2109	2.1	10.8	45	11.7	49	13.6	63	12.0	52	17.9	38.7
MN1607SP	1.6	10.1	46	11.1	52	13.5	65	11.6	54	18.0	37.7
MN1101SP	1.3	10.4	42	11.9	48	12.1	52	11.5	47	17.1	38.5
MN98-308007-EXP	1.7	10.6	46	11.4	50	12.9	60	11.6	52	17.8	38.4
MN98-324017-EXP	1.6	10.4	37	11.1	44	11.0	56	10.8	46	17.7	37.7
MN98-356045EXP	1.4	10.6	43	11.6	44	12.0	59	11.4	49	17.9	35.8
MN1503SP	1.5	10.4	43	11.4	51	12.6	61	11.5	52	18.2	37.6
MN2101SP	2.1	10.4	42	11.2	49	12.5	59	11.4	50	17.4	36.4
MN1606SP	1.6	10.9	43	11.2	52	13.5	64	11.9	53	17.7	37.4
MN2001SP	2.0	10.7	46	11.4	50	13.9	60	12.0	52	16.9	39.4
MN1201SP	1.2	10.3	42	11.0	44	11.7	57	11.0	48	17.6	37.8
LSD (P=0.10)		**0.3**	**4**	**0.8**	**4**	**1.2**	**4**		**2**		

Table 4. Soybean yield and protein and oil concentration of value-added varieties at Waseca, Potsdam, and Hope, MN in 2004

		YIELD (bu/A)					
Entry Name	**Description**	**Waseca**	**Potsdam**	**Hope**	**3 Site Average**	**% Oil ***	**% Protein ***
Monsanto DKB 22-52 RR	2.2 STATEWIDE CHECK	56.4	45.6	35.6	45.9	18.4	35.7
Brownseed B099	1	51.1	43.7	37.9	44.2	18.9	34.6
Gold Country Seed 314 FG	1.4	48.8	40.1	38.6	42.5	16.2	40.6
Gold Country Seed 6024 FG	2.4	49.3	48.2	42.4	46.6	17.7	38.6
Vinton 81	2.1-2.2	40.7	33.4	35.9	36.7	17.0	39.1
IA 1007		41.0	38.2	37.4	38.9	17.3	37.1
IA 1010		39.6	44.1	41.8	41.8	16.8	37.0
IA 1011		43.3	38.6	36.1	39.3	17.3	37.0
IA 1013		38.8	40.5	35.5	38.3	17.8	39.6
IA 2011	2.2	44.0	43.6	38.2	41.9	18.0	38.0
IA 2012		40.7	38	39.7	39.5	16.6	38.4
IA 2016	2.2	48.8	35.1	38.8	40.9	16.8	39.8
IA 2025		40.9	33.9	34.8	36.5	17.5	39.9
IA 2042 LF		49.5	42.4	38.3	43.4	17.4	38.2
IA 2053		49.7	42.9	40.4	44.3	16.7	39.4
IA 2067		46.0	42.1	37.1	41.7	16.8	40.7
Kin	1.9	50.2	37.8	39.1	42.4	17.5	37.1
Lariat	1.6	55.5	37.1	43	45.2	18.5	37.3
NK Brand S20-F8		58.1	50.6	40	49.6	NA	NA
NK Brand S18-N5		57.0	51.2	47.9	52.0	18.3	36.5
NorthLand Organic Royal Pro	1.6	49.0	35.5	36.3	40.3	17.1	38.8
NorthLand Organic Soya Pro		43.3	36.4	34.6	38.1	17.1	38.5
NorthLand Organic Sure Pro		47.7	43.5	43.5	44.9	15.7 **	41.8 **
Pioneer 92M10		56.3	46.6	41.6	48.2	18.1	36.8
PROFISEED 4215 RR		58.4	46.8	36.2	47.1	18.2	35.4
PROFISEED 4192 RR		55.0	48.8	43.8	49.2	19.0	34.6
Stine 1906-0		50.2	42.1	38.9	43.7	17.7	37.3
Stine 2686-6		54.9	49.9	51.3	52.0	18.4	36.4
EXP - 12		52.1	45.4	41.3	46.3	17.8	37.8
EXP - 14		47.2	43.3	36.6	42.4	16.6	39.8
EXP - 22		53.4	42.6	43.1	46.4	18.1	37.8
Viking O-2022	2	51.0	41.9	41.5	44.8	18.0	36.0
	LSD (0.10)	**5.2**	**6.1**	**5.1**			

*Oil and protein results from field trial at Hope. ** Oil and protein results from field trial at Potsdam.

HERBICIDE EVALUATION

CORN

Evaluation of Impact, a new pigment inhibitor herbicide, in field corn at Rochester, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Krista M. Sheehan, and Matthew M. White

The objective of this trial was to evaluate Impact, a new pigment inhibitor herbicide, for weed control in field corn in southeastern Minnesota. The research site was a Lawler loam series containing 2.4% organic matter with a pH test of 7.4 and soil test P and K levels of 52 ppm and 168 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 130 lb/A nitrogen, 23 lb/A phosphorus, 90 lb/A potash, and 19 lb/A sulfur. The field was topdressed with 40 lb/A of nitrogen on June 7, 2005. The field was disked and field cultivated prior to planting. The corn hybrid, DeKalb DKC 51-45RR, was planted on April 29, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. 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 30, June 15, June 24, and July 18. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	April 28	May 30
Treatment	PRE	POST
Temperature (F)		
air	49	64
Relative humidity (%)	33	52
Wind (mph)	6	3
Soil moisture	dry	adequate
Corn		
stage	Seeded	2 collar
height (inch)	--	3.5
Giant ragweed		
weed density (ft^2)	--	8.8
height (inch)	--	2.8
Common lambsquarters		
weed density (ft^2)	--	0.1
height (inch)	--	0.9
Common waterhemp		
weed density(ft^2)	--	92.3
height (inch)	--	0.8
Giant foxtail		
weed density (ft^2)	--	0.1
height (inch)	--	0.8
Rainfall after application (inch)		
week 1	0.12	0.11
week 2	1.26	2.06
week 3	1.65	0.19

CONCLUSIONS

No crop response was observed following any postemergence treatments. Significant differences were observed for giant ragweed control, with treatments containing Callisto providing superior control compared to those with Impact or Hornet, June 15, June 24, and July 18 ratings. Treatments with Impact provided significantly greater giant ragweed control compared to the Hornet treatment, June 15, June 24, and July 18 ratings.

Herbicide treatments with Impact and Callisto provided similar control of common lambsquarters and common waterhemp on all rating dates. Impact and Callisto treatments provided significantly greater control of common lambsquarters and common waterhemp compared to the Hornet treatment, June 15, June 24, and July 18 ratings.

Giant foxtail control was greatest, 95 to 97%, with Impact and Callisto treatments that included Accent. Impact and Callisto treatments without Accent provided appreciably higher control of giant foxtail than the Hornet treatment, 88 to 90% compared to 81% control, respectively, July 18 rating. (University of Minnesota Extension Service, Regional Center, Rochester, MN.)

Table. Performance of Impact, a new pigment inihibitor herbicide, for weed control in corn on May 30, June 15, June 24, and July 18 at Rochester, MN in 2005.

Treatment[a]	Rate	Giant ragweed control				Common lambsquarters control				Common waterhemp control				Giant foxtail control				Corn yield[b]
		5/30	6/15	6/24	7/18	5/30	6/15	6/24	7/18	5/30	6/15	6/24	7/18	5/30	6/15	6/24	7/18	
	(rate/A)	(%)				(%)				(%)				(%)				(bu/A)
PRE/POST																		
Dual II Magnum / Impact + AAtrex + MSO + 28% UAN	1.34 pt / 0.5 oz + 1 pt + 1% + 2.5%	0	95	93	91	71	99	99	99	99	97	97	98	90	98	98	90	164
Dual II Magnum / Impact + Accent + AAtrex + MSO + 28% UAN	1.34 pt / 0.5 oz + 0.67 oz + 1 pt + 1% + 2.5%	0	95	92	91	74	99	99	98	99	97	97	97	90	99	99	95	148
Dual II Magnum / Impact + AAtrex + MSO + 28% UAN	1.34 pt / 0.73 oz + 1 pt + 1% + 2.5%	0	94	94	91	71	99	99	99	99	98	96	98	90	98	97	88	157
Dual II Magnum / Impact + Accent + AAtrex + MSO + 28% UAN	1.34 pt / 0.73 oz + 0.67 oz + 1 pt + 1% + 2.5%	0	94	95	91	73	99	99	99	99	98	98	98	90	99	99	97	166
Dual II Magnum / Callisto + AAtrex + COC + 28% UAN	1.34 pt / 3 oz + 1 pt + 1% + 2.5%	0	98	99	98	71	99	99	99	99	98	99	98	90	97	97	89	167
Dual II Magnum / Callisto + Accent + AAtrex + COC + 28% UAN	1.34 pt / 3 oz + 0.67 oz + 1 pt + 1% + 2.5%	0	98	99	98	71	99	99	99	99	99	99	99	90	99	98	85	167
Dual II Magnum / Hornet + COC + 28% UAN	1.34 pt / 3 oz + 1% + 2.5%	0	72	84	81	73	97	93	84	99	95	93	90	90	97	97	81	165
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LSD (P=0.05)		0	2	4	3	4	1	3	3	0	2	4	4	0	1	2	5	29

a. Impact = proposed Trade name, MSO = DyneAmic methylated seed oil, Helena; 28% UAN = an aqueous solution of urea and ammonium nitrate; COC = Agri-dex crop oil concentrate, Helena.

b. Yield adjusted to 15.5% moisture. Corn yield variability due to extreme drought conditions in June and early July.

Evaluation of the performance of GWN-3075 for weed control in field corn at Potsdam, MN in 2005.

Behnken, Lisa M., Fritz R. Breitenbach, Angela L. White, and Kira L. Stearns

The objective of this trial was to evaluate the performance of GWN-3075 for weed control in field corn in southeastern Minnesota. The research site was a Port Byron silt loam containing 3.2% organic matter, soil pH of 6.7, and soil test P and K levels of 65 ppm and 273 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 144 lb/A of nitrogen, 23 lb/A of phosphorus, 120 lb/A of potash, and 24 lb/A of sulfur. The field was field cultivated twice prior to planting. The corn hybrid, Pioneer 38H69, was planted on May 6, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. Preplant incorporated (PPI) 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 31, June 6, June 16, June 27, and July 21. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	May 6	June 16
Treatment	PPI	POST
Temperature (F)		
Air	69	70
Soil	50	63
Relative humidity (%)	40	42
Wind (mph)	6	6
Soil moisture	dry	adequate
Cloud cover (%)	15	0
Corn		
stage	seeded	4-5 collar
height (inch)	0	14.1
Common lambsquarters		
Weed density (ft^2)	--	50.4
height (inch)	--	7.4
Velvetleaf		
Weed density (ft^2)	--	1.3
height (inch)	--	4.9
Wild proso millet		
Weed density (ft^2)	--	3.5
height (inch)	--	7.3
Rainfall after application (inch)		
Week 1	1.28	0.15
Week 2	1.63	1.23
Week 3	0.50	0.07

CONCLUSIONS

Minimal, but not statistically significant, amounts of crop injury were reported in the GWN-3075 treatments at the 5 and 6 pt/A rates. GWN-3075 applied at the 6 pt/A rate (all ratings) and at the 5 pt/A rate (May 31, June 27, and July 31 rating dates) provided significantly greater control of wild proso millet than Bicep Lite II Magnum. Wild proso millet control was also greater with the 6 pt/A rate of GWN-3075 compared to the 3 pt/A rate, May 31 and June 16 rating.

GWN-3075 at 6 pt/A provided greater common lambsquarters control than when applied at 5 pt/A or when applied at 3 pt/A (May 31 and June 16). The 5 pt/A rate of GWN-3075 resulted in similar common lambsquarters control as the Bicep Lite II Magnum treatment. However, both of these treatments provided greater control of common lambsquarters than the 3 pt/A rate of GWN-3075, May 31 and June 16.

GWN-3075 at 6 pt/A controlled velvetleaf better than when applied at 5 pt/A or 3 pt/A. However, GWN-3075 applied at either 6 or 5 pt/A resulted in significantly greater velvetleaf control than the Bicep Lite II Magnum treatment, all rating dates.

The sequential treatment of GWN-3075 at 3 pt/A followed by Roundup WeatherMax provided superior common lambsquarters control compared to all treatments. The sequential treatment resulted in similar wild proso millet and velvetleaf control as the GWN-3075 applied at 6 pt/A treatment and superior control compared to GWN-3075 at 5 pt/A or the Bicep Lite II Magnum treatment.

The highest corn yields were achieved with the GWN-3075 treatments, with all being statistically greater than the Bicep Lite II Magnum treatment. (University of Minnesota Extension Service, Regional Center, Rochester, MN)

Table. Performance of GWN-3075 for weed control in corn on May 31, June 16, June 27, and July 21 at Potsdam, MN in 2005.

Treatment[a]	Rate	Crop injury[b]	Wild proso millet control				Common lambsquarters control				Velvetleaf control				Corn yield[c]
		5/31	5/31	6/16	6/27	7/21	5/31	6/16	6/27	7/21	5/31	6/16	6/27	7/21	
	(rate/A)	(%)	(%)				(%)				(%)				(bu/A)
Preplant Incorporated															
GWN-3075	5 pt	3	98	92	87	80	92	91	77	79	96	94	73	83	217
GWN-3075	6 pt	3	99	97	93	89	99	98	88	88	99	98	87	96	211
Bicep Lite II Magnum	1.7 qt	0	94	88	79	73	94	91	85	75	88	88	63	65	200
Preplant Incorporated/ Postemergence															
GWN-3075 / Roundup WeatherMax + AMS	3 pt / 22 oz + 2 lbs	0	94	91	97	94	85	85	98	95	90	91	99	99	217
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	64
LSD (P = 0.10)		3	3	6	6	7	6	5	6	4	4	3	10	6	9

a. AMS = spray grade ammonium sulfate
b. Crop stunting
c. Yield at 15.5% moisture

Evaluation of the performance of KIH-485 for weed control in field corn at Rochester, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Kira L. Stearns and Angela L. White

The objective of this trial was to evaluate the performance of KIH-485 for weed control in field corn in southeastern Minnesota. The research site was a Lawler loam series containing 2.5% organic matter with a pH of 7.0 and soil test P, K, and S levels of 58 ppm, 216 ppm, and 6 ppm, respectively. The area was fertilized in the spring with 130 lb/A of nitrogen, 23 lb/A of phosphorus, 90 lb/A of potash, and 19 lb/A of sulfur. The area was also side dressed with an additional 40 lb/A of nitrogen on June 7. The previous crop was soybean. The field was disked and field cultivated once prior to planting. The corn hybrid, NK Brand N43M9 YGCB-LL, was planted on April 18, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. 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 17, May 26, June 15, and June 24. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	April 18	May 30
Treatment	PRE	POST
Temperature (F)		
air	74	64
soil	61	42
Relative humidity (%)	41	52
Wind (mph)	16	3
Soil moisture	adequate	adequate
Cloud cover (%)	30	3
Corn		
stage	seeded	2 collar
height (inch)	--	3.5
Woolly cupgrass		
weed density (ft^2)	--	7.3
height (inch)	--	0.8
Giant ragweed		
weed density (ft^2)	--	5.4
height (inch)	--	3.5
Common lambsquarters		
weed density (ft^2)	--	6.3
height (inch)	--	1.6
Common waterhemp		
weed density (ft^2)	--	24
height (inch)	--	0.7
Rainfall after application (inch)		
week 1	1.04	0.42
week 2	0.07	1.84
week 3	0.37	0.25

CONCLUSIONS

Significantly lower woolly cupgrass control was achieved when using Dual II Magnum and KIH-485 at the 4 oz/A and 5 oz/A rate compared to Harness and KIH-485 at 6 oz/A, and the KIH-485 + AAtrex tank mix on May 17. Woolly cupgrass control significantly increased on the June 15 and June 24 ratings with KIH-485 at 6 oz/A and the KIH-485 + AAtrex treatments showing the greatest amount of control. All of the KIH-485 treatments exhibited better woolly cupgrass control than Dual II Magnum and Harness on the June 15 and June 24 rating dates.

The KIH-485 + AAtrex tank mix gave statistically better giant ragweed control than all other treatments, May 17 and 26 ratings, with the exception of KIH-485 at 6 oz/A, May 17 rating. Giant ragweed control greatly increased following Clarity applications.

All KIH-485 treatments and Harness gave excellent common lambsquarters control on the May 17 rating date. Significantly lower common lambsquarters control was recorded with the 4 oz/A rate of KIH-485 and Dual II Magnum on the May 26 rating.

Common waterhemp control was exceptional in all treatments on all rating dates. A slight reduction of control was noted for Harness on June 24. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table. Performance of KIH-485 for weed control in field corn on May 17, May 26, June 15, and June 24 at Rochester, MN in 2005.

Treatment	Rate	Woolly cupgrass control				Giant ragweed control				Common lambsquarters control				Common waterhemp control				Corn yield[a]
		5/17	5/26	6/15	6/24	5/17	5/26	6/15	6/24	5/17	5/26	6/15	6/24	5/17	5/26	6/15	6/24	
	(rate/A)	(%)				(%)				(%)				(%)				(bu/A)
Preemergence / Postemergence																		
KIH-485 / Clarity	4 oz / 12 oz	82	74	93	92	9	8	96	99	95	78	98	98	99	99	98	99	100
KIH-485 / Clarity	5 oz / 12 oz	88	86	96	95	16	14	97	99	98	89	98	99	99	99	99	99	92
KIH-485 / Clarity	6 oz / 12 oz	93	90	97	97	34	24	97	99	99	93	99	99	99	99	99	99	82
Dual II Magnum / Clarity	1.33 pt / 12 oz	90	91	89	85	0	0	94	99	85	71	95	97	99	99	99	97	109
Harness / Clarity	1.75 pt / 12 oz	98	93	88	84	28	9	96	99	99	98	99	96	99	99	99	94	92
KIH-485 + AAtrex / Clarity	5 oz + 0.75 qt	93	90	95	98	40	39	28	10	99	98	98	99	99	99	98	99	4
Postemergence																		
Clarity	12 oz	0	0	0	0	0	0	97	99	0	0	94	99	0	0	91	99	37
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LSD (P=0.10)		4	3	3	1	9	6	6	1	3	6	2	1	1	1	4	1	28

a. Yield adjusted to 15.5% moisture.

Evaluation of the performance of KIH-485 for weed control in field corn at Potsdam, MN in 2005.

Behnken, Lisa M., Fritz R. Breitenbach, Kira L. Stearns, and Kristal L. Schaufler

The objective of this trial was to evaluate the performance of KIH-485 for weed control in field corn in southeastern Minnesota. The research site was a Port Byron silt loam containing 3.2% organic matter, soil pH of 6.7, and soil test P and K levels of 65 ppm and 273 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 144 lb/A of nitrogen, 23 lb/A of phosphorus, 120 lb/A of potash, and 24 lb/A of sulfur. The field was field cultivated twice prior to planting. The corn hybrid, Pioneer 38H69, was planted on May 6, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. 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 31, June 6, June 16, and June 27. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	May 6	June 7
Treatment	PRE	POST
Temperature (F)		
air	71	92
soil	50	NA
Relative humidity (%)	35	55
Wind (mph)	8	20
Soil moisture	Dry	Adequate/wet
Cloud cover (%)	15	50
Corn		
stage	seeded	V2-V3
height (inch)	0	5.3
Common lambsquarters		
weed density(ft^2)	--	59.1
height (inch)	--	1.5
Velvetleaf		
weed density(ft^2)	--	0.4
height (inch)	--	NA
Wild proso millet		
weed density(ft^2)	--	3.0
height (inch)	--	0.6
Rainfall after application (inch)		
week 1	1.27	2.20
week 2	1.81	0.20
week 3	0.31	1.50

CONCLUSIONS

No crop injury response was observed from any of the treatments in this trial. KIH-485 at the 5 and 6 oz/A rates, KIH-485 + AAtrex, and Harness provided statistically greater control of wild proso millet than Dual II Magnum on the May 31 and June 16 ratings. KIH-485 at the 6 oz/A rate and the KIH-485 + AAtrex tank mix provided statistically better control of wild proso millet than Dual II Magnum, and Harness on the June 27 rating.

All KIH-485 treatments and Harness provided statistically superior control of common lambsquarters when compared to Dual II Magnum on all rating dates. On the June 27 rating date, the KIH-485 + AAtrex tank mix provide statistically higher common lambsquarters control than all other treatments except the postemergence treatment of Clarity.

KIH-485 and the KIH-485 + AAtrex tank mix provided significantly greater control of velvetleaf than Dual II Magnum, and Harness on all rating dates. All KIH 485 treatments and the Harness treatments resulted in yields significantly higher than the Dual II Magnum treatment. (University of Minnesota Extension Service, Regional Center, Rochester, MN)

Table. Performance of KIH-485 for weed control in field corn on May 31, June 6, June 16, and June 27 at Potsdam, MN in 2005.

Treatment	Rate	Wild proso millet control			Common lambsquarters control			Velvetleaf control			Corn yield[a]
		5/31	6/16	6/27	5/31	6/16	6/27	5/31	6/16	6/27	
	(rate/A)	(%)			(%)			(%)			(bu/A)
Preemergence											
KIH-485	4 oz	97	88	87	97	94	86	99	91	86	220
KIH-485	5 oz	98	92	89	98	95	88	99	92	87	217
KIH-485	6 oz	99	94	93	99	97	92	98	95	91	216
Dual II Magnum	1.33 pt	94	81	84	77	63	25	84	70	58	180
Harness	1.75 pt	99	93	88	99	95	87	79	78	68	213
KIH-485 + AAtrex	5 oz	99	93	92	99	96	97	99	92	91	213
Postemergence											
Clarity	12 oz	0	0	0	0	65	95	0	75	98	154
Untreated		0	0	0	0	0	0	0	0	0	74
LSD (P=0.10)		1	6	4	1	3	5	5	8	11	16

a. Yield adjusted to 15.5% moisture.

Evaluation of the application timings of Callisto, Touchdown Total, and Roundup WeatherMax based programs in field corn at Rochester, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Corey W. Stever, and Krista M. Sheehan

The objective of this trial was to evaluate and compare the performance of Callisto, Touchdown Total, and Roundup WeatherMax based programs for weed control in field corn in southeastern Minnesota. The research site was a Lawler series loam containing 2.4% organic matter with a pH test of 7.4 and soil test P and K levels of 52 ppm and 168 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 130 lb/A nitrogen, 23, lb/A phosphorus, 90 lb/A potash, and 13 lb/A sulfur. The area was top dressed with 40 lb/A of nitrogen on June 7, 2005. The field was disked and field cultivated once prior to planting. The corn hybrid, DeKalb DKC 51-45RR, was planted on April 29, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. 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 May 20, May 26, June 15, and June 24. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	April 29	May 24	June 2	June 6	June 16
Treatment	PRE	POST I	POST II	POST III	POST IV
Temperature (F)					
air	49	73	68	79	73
soil	50	--	68	80	65
Relative humidity (%)	33	44	58	46	44
Wind (mph)	6	8	14	14	6
Soil moisture	dry	adequate	adequate	dry/ adequate	adequate
Corn					
stage	Seeded	LS2	3 collar	3-4 collar	6 collar
height (inch)	--	2.5	4.8	7.1	15
Giant ragweed					
weed density (ft^2)	--	15.9	15.9	15.9	15.9
height (inch)	--	2.4	5.5	10.5	3.8
Common waterhemp					
weed density (ft^2)	--	116	116	116	116
height (inch)	--	0.2	0.8	0.6	2.5
Common lambsquarters					
weed density (ft^2)	--	1.0	1.0	1.0	1.0
height (inch)	--	0.6	2.0	1.4	1.5
Giant foxtail					
weed density (ft^2)	--	1.1	1.1	1.1	1.1
height (inch)	--	0.4	1.5	0.0	1.1
Rainfall after application (inch)					
week 1	0.12	0.31	1.82	2.06	0.15
week 2	1.65	1.45	0.54	0.19	1.23
week 3	0.31	0.25	0.15	1.29	0.07

CONCLUSIONS

The five preemergence treatments afforded very good weed control across the spectrum of weeds evaluated in this trial. Early season differences (reduced control) were observed for KIH-485 + Hornet for giant ragweed, however, no differences were measurable during later ratings.

PRE/POST I treatments consisted of split applications of Lumax or Camix. Both of these treatments provided very good weed control as measured by the final weed rating. However, the Lumax split treatment provided better early season giant ragweed control.

PRE/POST II treatments consisted of reduced rates of soil applied herbicides followed by Touchdown Total or Roundup WeatherMax, compared to Dual II Magnum followed by Callisto + AAtrex. Soil applied products with atrazine or Callisto provided some suppression of giant ragweed. The soil applied product with the highest atrazine component provided the best early season giant ragweed control. The Dual II Magnum / Callisto + AAtrex treatment provided the best late season giant ragweed control. Significantly reduced common waterhemp control was observed in the Harness Xtra / Roundup WeatherMax treatment for the last two ratings.

POST I treatments consisted of reduced rates of Lumax, Lexar, or Camix (applied for residual control) tank mixed with Touchdown Total. The above three treatments were compared to a POST I only application of Roundup WeatherMax. Excellent weed control was achieved with the residual products tank mixed with Touchdown Total. The Roundup WeatherMax only treatment applied at POST I provided significantly reduced control of giant ragweed, common waterhemp, and giant foxtail.

Roundup WeatherMax only applications were also made POST II, POST III, and sequentially at POST II / POST IV. The POST II / POST IV sequential applications provided the most consistent weed control. POST III applications provided the next highest weed control; however, a slight reduction in giant ragweed control was observed and dramatically reduced common waterhemp control was evident. POST II applications also resulted in significantly lower giant ragweed and common waterhemp control when compared to the sequential applications of Roundup WeatherMax. POST I applications provided significantly reduced control of giant ragweed, common waterhemp, and giant foxtail when compared to all other application timings with Roundup WeatherMax. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table. Performance of Callisto, Touchdown Total, and Roundup WeatherMax systems for weed control in corn on May 20, May 26, June 15, and June 24 at Rochester, MN in 2005.

Treatment[a]	Rate	Giant ragweed control				Common lambsquarters control			Common waterhemp control			Giant foxtail control			Corn yield[b]
		5/20	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	
	(rate/A)	(%)				(%)			(%)			(%)			(bu/A)
PRE															
Lumax	2.5 qt	60	75	93	94	99	99	99	99	99	99	99	95	97	198
Lexar	3 qt	71	79	96	95	99	99	99	99	99	99	99	96	97	179
Keystone LA + Hornet	2 qt + 3 oz	78	85	91	89	99	99	99	99	97	98	99	96	97	161
KIH-485 + Callisto	5 oz + 5 oz	34	68	90	93	99	99	99	99	99	99	99	97	99	174
KIH-485 + Hornet	5 oz + 3 oz	64	65	86	90	99	99	99	99	99	99	99	97	97	172
PRE / POST I															
Lumax / Lumax + NIS	1.25 qt / 1.25 qt + 0.25%	34	63	97	98	99	99	99	99	99	99	99	98	99	212
Camix / Camix + NIS	1 qt / 1 qt + 0.25%	15	59	95	96	99	99	99	99	99	99	97	97	98	192
PRE / POST II															
Camix / Touchdown Total + AMS	1.2 qt / 24 oz + 3 lb	18	56	89	90	99	99	99	99	99	98	99	99	98	187
Lumax / Touchdown Total + AMS	1.5 qt / 24 oz + 3 lb	39	64	91	88	99	99	99	99	99	99	99	98	96	202
Lexar / Touchdown Total + AMS	1.75 qt / 24 oz + 3 lb	55	71	94	90	99	99	99	99	99	96	99	97	98	203
Dual II Magnum / Callisto + AAtrex + COC + 28% UAN	1.34 pt / 3 oz + 1 pt + 1% + 2.5%	0	0	97	99	0	99	99	0	99	99	0	98	98	212
Harness Xtra / Roundup WeatherMax + AMS	1 qt / 22 oz + 3 lb	23	25	84	87	86	99	99	97	75	73	98	95	96	193
POST I															
Camix + Touchdown Total + AMS	1.2 qt + 24 oz + 3 lb	0	0	85	92	0	99	99	0	99	99	0	96	98	193
Lumax + Touchdown Total + AMS	1.5 qt + 24 oz + 3 lb	0	0	91	98	0	98	99	0	83	99	0	94	94	194
Lexar + Touchdown Total + AMS	1.75 qt + 24 oz + 3 lb	0	0	97	99	0	99	99	0	99	99	0	99	99	196
Roundup WeatherMax + AMS	22 oz +3 lb	0	0	43	40	0	97	95	0	43	25	0	79	61	23

Treatment[a]	Rate	Giant ragweed control				Common lambsquarters control			Common waterhemp control			Giant foxtail control			Corn yield[b]
		5/20	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	
	(rate/A)	(%)				(%)			(%)			(%)			(bu/A)
POST II															
Roundup WeatherMax + AMS	22 oz + 3 lb	0	0	85	84	0	97	93	0	50	43	0	93	92	183
POST II / POST IV															
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 lb / 22 oz + 3 lb	0	0	86	97	0	95	99	0	54	90	0	94	99	204
POST III															
Roundup WeatherMax + AMS	22 oz + 3 lb	0	0	92	90	0	97	96	0	53	43	0	98	98	189
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	2
LSD (P = 0.05)		7	9	5	7	8	1	2	1	11	6	2	4	6	39

a. NIS = AGRI-DEX nonionic surfactant, Helena; AMS = spray grade ammonium sulfate; COC = crop oil concentrate, Helena; 28% UAN = an aqueous solution of urea and ammonium nitrate.
b. Yield adjusted to 15.5% moisture. Corn yield variability due to extreme drought conditions in June and early July.

Evaluation of the performance of adjuvant/deposition aids with Liberty in field corn at Potsdam, MN in 2005.

Behnken, Lisa M., Fritz R. Breitenbach, Kristal L. Schaufler, and Corey W. Stever

The objective of this trial was to evaluate and compare the performance of Liberty with various spray adjuvant/depositions aids for weed control in field corn in southeastern Minnesota. The research site was a Port Byron silt loam containing 3.2% organic matter with a pH of 6.7 and soil test P and K levels of 65 ppm and 273 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 144 lb/A nitrogen, 23 lb/A phosphorus, 120 lb/A potash, and 24 lb/A sulfur. The field was disked and field cultivated twice prior to planting. The corn hybrid, Pioneer 38H69, was planted on May 6, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. 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 16 and 27. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	June 10
Treatment	POST
Temperature (F)	
Air	78
Relative humidity (%)	75
Wind (mph)	15
Soil moisture	wet
Corn	
stage	V3
height (inch)	8
Velvetleaf	
weed density (ft^2)	1
height (inch)	2.9
Common lambsquarters	
weed density(ft^2)	59
height (inch)	3.0
Wild proso Millet	
weed density(ft^2)	3
height (inch)	2.5
Rainfall after application (inch)	
week 1	0.19
week 2	0.15
week 3	1.23

CONCLUSIONS

Common lambsquarters control ranged from 53 to 99%, June 27 rating, and control was significantly impacted by the adjuvant or deposition aid, the rate of Liberty used, and the addition of atrazine. The best control, 98 to 99%, of common lambsquarters was achieved when atrazine was included in the treatments. Liberty at 26 oz/A + either Premium AMS or Cornbelt N-Tense provided significantly greater common lambsquarters control than when applied at the 20 oz/A rate with either product. Liberty at 20 oz/A plus either of this products resulted in similar control, 80 to 81%, however, when the higher rate of Liberty was used with Cornbelt N-Tense, common lambsquaters control increased to 89% compared to 85% for Premium AMS, July 27 rating. Liberty at 20 oz/A + One-Ap XL resulted in significantly lower control, 63% on June 16 and 53% on June 27, compared to all other treatments, including the Liberty alone treatment.

Wild proso millet control was significantly lower in the Liberty + One-Ap XL treatment compared to all other treatments, except one, Liberty at 20 oz/A + Cornbelt N-Tense. Increasing the rate of Liberty from 20 to 26 oz/A + Cornbelt N-Tense significantly increased wild proso millet control, from 87 to 93%, respectively. No difference in wild proso millet control was recorded when an increased rate of Liberty was used with Premium AMS.

The lowest corn yield was observed in the Liberty + One AP XL treatment. (University of Minnesota Extension Service, Regional Center, Rochester)

Table. Performance of adjuvant/deposition aids with Liberty for weed control in corn on June 16 and June 27 at Potsdam, MN in 2005.

Treatment [a]	Rate	Wild proso millet control		Common lambsquarters control		Velvetleaf control		Corn yield [b]
		6/16	6/27	6/16	6/27	6/16	6.27	
	(rate/A)	(%)		(%)		(%)		(bu/A)
Postemergence								
Liberty	20 oz	88	91	78	73	99	98	205
Liberty+ Premium AMS	20 oz + 3 lb	93	91	85	81	99	98	214
Liberty+ atrazine[1] + Premium AMS	20 oz +1 pt + 3 lb	93	96	83	99	99	99	224
Liberty+ One-Ap XL	20 oz + 3 lb	91	85	53	53	99	97	202
Liberty+ atrazine[1] + One-Ap XL	20 oz + 1 pt + 3 lb	90	91	84	98	99	98	220
Liberty+ Cornbelt N-Tense	20 oz + 0.75%	93	87	84	80	99	98	215
Liberty + atrazine[1] + Cornbelt N-Tense	20 oz + 1 pt + 0.75%	91	95	84	99	99	98	214
Liberty+ atrazine[1] + WC045	20 oz + 1 pt + 0.75%	92	97	82	99	99	99	212
Liberty+ Premium AMS	26 oz + 3 lb	94	90	88	85	99	99	214
Liberty+ Cornbelt N-Tense	26 oz + 0.75%	94	93	89	89	99	99	219
Weedy Check		0	0	0	0	0	0	54
Weed Free		100	100	100	100	100	100	226
LSD (P = 0.10)		4	4	7	3	0	2	12

a. Atrazine [1] = Cornbelt atrazine
b. Yield at 15.5% moisture.

Evaluation of weed management systems in field corn at Rochester, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Thomas R. Hoverstad and Jeffrey L. Gunsolus.

The objective of this trial was to evaluate weed management systems for weed control in field corn in southeastern Minnesota. The research site was a Lawler loam series containing 2.8% organic matter with a pH of 7.2 and soil test P and K levels of 61 ppm and 196 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 130 lb/A nitrogen, 23 lb/A phosphorus, 90 lb/A potash, and 19 lb/A sulfur. The area was topdressed with 40 lb/A of nitrogen on June 7, 2005. The field was disked and field cultivated once prior to planting. The corn hybrid, Pioneer 38H69, was planted on May 3, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. Preemergence (PRE) and postemergence (POST I and 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 May 26, June 10, June 15 and June 24. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	May 3	May 30	June 6
Treatment	PRE	POST I	POST II
Temperature (F)			
air	64	67	84
soil	40	48	83
Relative humidity (%)	14	47	48
Wind (mph)	10	6	9
Soil moisture	dry	adequate	adequate/dry
Corn			
stage	seeded	2 collar	3 collar
height (inch)	--	3.0	6.5
Giant ragweed			
weed density (ft^2)	--	9.4	9.4
height (inch)	--	1.6	5.4
Common waterhemp			
weed density(ft^2)	--	98.2	98.2
height (inch)	--	0.5	1.0
Common lambsquarters			
weed density(ft^2)	--	1.0	1.0
height (inch)	--	0.8	2.4
Woolly cupgrass			
weed density(ft^2)	--	3.0	3.0
height (inch)	--	0.6	1.0
Rainfall after application (inch)			
week 1	0.36	0.11	2.06
week 2	1.07	2.06	0.19
week 3	1.75	0.19	1.29

CONCLUSIONS

Premergence only treatments of Keystone LA + Hornet WDG and Lumax provided consistently good giant ragweed control on all rating dates, resulting in similar levels of control. Both treatments also provided excellent common waterhemp, common lambsquarters, and giant foxtail control, resulting in similar levels of control.

PRE / POST II applications afforded good giant ragweed control with the exception of the Define SC / Option + Distinct + MSO + 28% N treatment, and treatments containing Aim or ET. PRE / POST II applications with a reduced rate soil applied treatment provided significantly lower common waterhemp control when compared to treatments with full rates of soil applied herbicides. The Basis / AAtrex + Roundup Original Max also resulted in significantly reduced common waterhemp control. All PRE / POST II treatments achieved excellent common lambsquarters and giant foxtail control.

POST I and II only applications resulted in good giant ragweed control with the exception of the Option + Callisto + MSO + 28% UAN treatment. Treatments containing Lumax provided consistently better common waterhemp control. Good common lambsquarters control was achieved by all POST I and II treatments. Excellent giant foxtail control was realized with the treatments containing Roundup WeatherMax, Glyphomax XRT, Roundup Original Max, or Touchdown Total. Slightly reduced control was observed in the Steadfast + Callisto + AAtrex + COC + N-PAK AMS, and Basis + Lumax+ NIS treatments. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table. Performance of weed management systems for weed control in corn on May 26, June 15, and June 24 at Rochester, MN in 2005.

Treatment[a]	Rate	Giant ragweed control			Common lambsquarters control			Common waterhemp Control			Giant foxtail control			Corn Yield[b]
		5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	
	(rate/A)	(%)			(%)			(%)			(%)			(bu/A)
PRE														
Keystone LA + Hornet WDG	2.2 qt + 4 oz	90	89	93	99	99	99	99	99	99	99	99	98	137
Lumax	6 pt	84	95	97	99	99	99	99	99	99	99	99	99	144
PRE / POST II														
Surpass / Hornet WDG + Callisto + atrazine + COC + N-PAK AMS	2.75 pt / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	60	98	98	99	99	99	99	99	99	99	99	99	160
KIH-485 / Hornet WDG + Callisto + atrazine + COC + N-PAK AMS	8 oz / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	56	97	99	99	99	99	99	99	99	96	99	99	156
Outlook / Distinct + atrazine + NIS + N-PAK AMS	21 oz / 4 oz + 16 oz + 0.25% + 3 qt	39	92	98	98	99	99	99	99	96	99	99	99	166
Outlook / Clarity + ET + atrazine + NIS + N-PAK AMS	21 oz / 3 oz + 0.5 oz + 16 oz + 0.25% + 3 qt	44	78	85	99	99	99	99	99	95	99	99	99	154
Define SC / Liberty + atrazine + N-PAK AMS	12 oz / 32 oz + 16 oz + 3.5 qt	4	96	97	76	99	99	83	99	80	80	99	99	143
Define SC / Option + Distinct + MSO + 28% N	12 oz / 1.5 oz + 2 oz + 1.5 pt + 1.5 qt	3	70	78	76	99	99	92	99	76	77	99	99	155
Cinch / Steadfast + Callisto + atrazine + COC + N-PAK AMS	1 pt / 0.75 oz + 2 oz + 16 oz + 1% + 2.35 qt	5	93	98	78	99	99	99	99	98	73	99	99	157
Dual II Magnum / Callisto + atrazine + COC + 28% N	2 pt / 3 oz + 16 oz + 1% + 2.5%	10	95	99	89	99	99	99	99	99	90	99	98	168
Outlook / Aim + atrazine + Clarity + NIS	21 oz / 0.5 oz + 16 oz + 3 oz + 0.25%	31	77	83	99	99	99	99	99	91	99	99	99	152
Harness / Roundup WeatherMax + N-PAK AMS	1.25 pt / 22 oz + 3 qt	25	96	91	99	99	99	99	99	79	98	99	98	150
Keystone LA / Glyphomax XRT + N-PAK AMS	1.1 qt / 24 oz + 3 qt	65	96	94	99	99	99	99	99	85	97	99	99	161
Outlook / Roundup WeatherMax + Distinct + NIS + N-PAK AMS	12 oz / 11 oz + 3 oz + 0.25% + 3 qt	15	94	95	85	99	99	99	99	83	88	99	99	175

Treatment[a]	Rate	Giant ragweed control			Common lambsquarters control			Common waterhemp Control			Giant foxtail control			Corn Yield[b]
		5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	
	(rate/A)	(%)			(%)			(%)			(%)			(bu/A)
Outlook / Roundup WeatherMax + Clarity + ET + NIS + N-PAK AMS	12 oz / 11 oz + 3 oz + 0.5 oz + 0.25% + 3 qt	13	78	87	81	99	99	99	99	79	87	99	99	174
Outlook / Roundup WeatherMax + ET + NIS + N-PAK AMS	12 oz / 11 oz + 0.5 oz + 0.25% + 3 qt	14	74	81	82	99	98	99	99	77	82	99	99	154
Outlook / Roundup WeatherMax + Clarity + NIS + N-PAK AMS	12 oz / 11 oz + 3 oz + 0.25% + 3 qt	15	87	93	80	90	98	99	96	77	83	99	98	172
Basis / atrazine + Roundup Original Max	0.4 oz / 12 oz + 22 oz	34	93	94	99	99	99	43	83	69	63	99	99	158
POST I														
Basis + Lumax + NIS	0.33 oz + 3.5 pt + 0.25%	0	98	99	0	99	99	0	97	98	0	89	87	160
Lumax + Touchdown Total + N-PAK AMS	3 pt + 24 oz + 2 qt	0	99	99	0	99	99	0	99	99	0	93	91	156
Lumax + Liberty + N-PAK AMS	3 pt + 20 oz + 2 qt	0	98	98	0	99	99	0	99	99	0	94	92	162
Steadfast + Lumax + NIS	0.75 oz + 2 pt + 0.25%	0	96	95	0	99	99	0	98	95	0	96	95	157
POST II														
Option + Callisto + MSO + 28% UAN	1.5 oz + 1.5 oz + 1.5 pt + 1.5 qt	0	60	66	0	99	99	0	85	79	0	99	93	125
Steadfast + Callisto + atrazine + COC + N-PAK AMS	0.75 oz + 2 oz + 16 oz + 1% + 2.35 qt	0	90	97	0	99	99	0	95	86	0	89	89	167
E9636 + Roundup Original Max + N-PAK AMS	1 oz + 22 oz + 2.35 qt	0	96	95	0	98	97	0	86	95	0	99	99	169
E9636 + atrazine + Roundup Original Max + N-PAK AMS	1 oz + 16 oz + 22 oz + 2.35 qt	0	76	96	0	99	99	0	91	76	0	99	99	173
Weedy		0	0	0	0	0	0	0	0	0	0	0	0	1
Weed Free		100	100	100	100	100	100	100	100	100	100	100	100	142
LSD (P = 0.10)		9	4	3	6	0	1	5	4	5	5	3	3	39

a. COC = Agri-dex crop oil concentrate, N-PAK AMS = ammonium sulfate solution, Agriliance LLC, NIS = nonionic surfactant, MSO = methylated seed oil , 28% UAN = an aqueous solution of urea and ammonium nitrate.

b. Yield adjusted to 15.5% moisture. Corn yield variability due to extreme drought conditions in June and early July.

2005 Corn Herbicide Evaluation
University of Minnesota
Combined across all sites - Lamberton, Rochester, Waseca

	Herbicide	Rate	Giant foxtail	Yellow Foxtail	Common ragweed	Giant ragweed	Common cocklebur	Velvetleaf	Common lambsquarters.	Redroot pigweed	Tall waterhemp	Yield	Cost	Returns
			Number of locations									5		5
		(product/A)	5	1	2	2	2	2	3	2	2	(bu/A)	($/A)	($/A)
	Preemergence		------- % Control -------											
1	Keystone LA + Hornet WDG	2.2 qt + 4oz	97	83	99	95	94	88	98	99	99	183	41.77	273
2	Lumax	6 pt	88	77	99	89	71	90	99	99	95	181	40.10	270
	Preemergence/POST II (V4 corn)													
3	Surpass / Hornet + Callisto + atrazine + COC + AMS	2.75 pt / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	98	92	97	99	99	99	99	99	99	193	52.81	279
4	KIH-485 / Hornet + Callisto + atrazine + COC + AMS	8 oz / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	91	91	99	99	99	99	99	98	99	189	na	na
5	Outlook / Distinct + atrazine + NIS + AMS	21 oz / 4 oz + 16 oz + 0.25% + 2.5 lb	99	89	99	98	99	99	99	99	97	190	48.61	279
6	Define SC/ Liberty+atrazine+AMS	12 oz / 32 oz + 16 oz + 3.5 qt	99	86	99	98	97	97	99	99	89	187	42.66	278
7	Define SC/ Option+Distinct+MSO+28%	12 oz / 1.5 oz + 2 oz + 1.5 pt + 3 pt	98	92	98	88	96	98	99	98	84	183	47.76	264
8	Cinch/ Steadfast+Callisto+atrazine+COC+AMS	1 pt / 0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	98	88	99	98	96	99	99	99	99	187	52.84	266
9	Dual II Magnum/ Callisto+atrazine+COC+28%N	2 pt / 3 oz + 16 oz + 1% + 2.5%	95	92	99	99	99	99	99	99	99	193	54.69	276
10	Outlook/ Aim+atrazine+Clarity+NIS	21 oz / 0.5 oz + 16 oz + 3 oz + 0.25%	92	92	98	90	97	95	99	98	95	186	40.79	278
11	Harness/ Roundup WeatherMax+AMS	1.25 pt / 22 oz + 3 qt	99	84	99	94	96	95	98	99	89	192	47.85	282
12	Keystone LA / Glyphomax XRT + AMS	2.2 pt / 24 oz + 3 qt	99	87	99	96	97	97	99	99	92	185	44.00	273
13	Outlook/ Distinct + RoundupWeatherMax + NIS + AMS	12 oz / 3 oz + 11 oz + 0.25% + 3 qt	99	89	99	97	96	99	99	98	91	197	52.77	286
14	Basis + atrazine/ Roundup OriginalMax	0.4 oz + 12 oz/ 22 oz	98	79	99	96	96	96	99	97	83	193	35.99	296
	Checks													
15	Weedy Check	-	0	0	0	0	0	0	0	0	0	77	0.00	134
16	Weed-Free Check	-	100	100	100	100	100	100	100	100	100	186	0.00	319
	POST I (V2 corn)													
17	Basis + Lumax + NIS	0.33 oz + 3.5 pt + 0.25%	92	94	99	99	93	99	99	99	99	195	32.12	303
18	Lumax + Touchdown Total + AMS	3 pt + 24oz + 2 qt	97	92	99	99	97	99	99	98	98	197	43.57	294
19	Lumax + Liberty + AMS	3 pt + 20oz + 2 qt	97	95	99	98	95	99	99	98	99	194	34.62	299
20	Steadfast + Lumax + NIS	0.75 oz + 2 pt + 0.25%	97	88	97	97	90	99	99	98	97	197	33.93	305
	POST II (V3 corn)													
21	Option + Callisto + MSO + 28%N	1.5 oz + 1.5 oz + 1.5 pt + 3 pt	94	75	96	83	96	99	99	99	88	184	32.17	283
	POST III (V4 corn)													
22	Steadfast+Callisto+atrazine+COC+AMS	0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	95	86	99	98	96	99	99	99	93	195	34.07	300
23	Resolve + Roundup OriginalMax + AMS	1 oz + 22 oz + 4.7 pt	98	84	97	96	97	98	98	97	86	190	32.23	293
24	Resolve + atrazine + Roundup OriginalMax + AMS	1 oz + 16 oz + 22 oz + 4.7 pt	98	85	98	98	96	98	99	98	87	200	33.51	310
		LSD (0.10)	2	6	2	5	3	4	1	1	4	10		17

2005 Corn Herbicide Evaluation - Rochester

Herbicide	Rate	Giant foxtail	Giant ragweed	Tall waterhemp	Common lambsquarters	H2O	Yield	Cost	Returns
Preemergence	(product/A)		(% control)			(%)	(bu/A)	($/A)	($/A)
Keystone LA + Hornet WDG	2.2 qt + 4oz	98	93	99	99	18.6	137	41.77	195
Lumax	6 pt	99	97	99	99	18.7	144	40.10	208
Preemergence/POST III (V4 corn)									
Surpass / Hornet + Callisto + atrazine + COC + AMS	2.75 pt / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	99	98	99	99	18.8	160	52.81	222
KIH-485 / Hornet + Callisto + atrazine + COC + AMS	8 oz / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	99	99	99	99	18.9	155	na	
Outlook / Distinct + atrazine + NIS + AMS	21 oz / 4 oz + 16 oz + 0.25% + 2.5 lb	99	98	96	99	18.8	166	48.61	238
Define SC/ Liberty+atrazine+AMS	12 oz / 32 oz + 16 oz + 3.5 qt	99	97	80	99	19.1	143	42.66	202
Define SC/ Option+Distinct+MSO+28%	12 oz / 1.5 oz + 2 oz + 1.5 pt + 3 pt	99	78	76	99	19.7	155	47.76	215
Cinch/ Steadfast+Callisto+atrazine+COC+AMS	1 pt / 0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	99	98	98	99	19.6	157	52.84	214
Dual II Magnum/ Callisto+atrazine+COC+28%N	2 pt / 3 oz + 16 oz + 1% + 2.5%	98	99	99	99	19.2	168	54.69	232
Outlook/ Aim+atrazine+Clarity+NIS	21 oz / 0.5 oz + 16 oz + 3 oz + 0.25%	99	83	91	99	18.8	152	40.79	220
Harness/ Roundup WeatherMax+AMS	1.25 pt / 22 oz + 3 qt	98	91	79	99	18.7	150	47.85	211
Keystone LA / Glyphomax XRT + AMS	2.2 pt / 24 oz + 3 qt	99	94	85	99	18.5	161	44.00	235
Outlook/ Distinct + RoundupWeatherMax + NIS + AMS	12 oz / 3 oz + 11 oz + 0.25% + 3 qt	99	95	83	99	19.1	175	52.77	248
Basis + atrazine/ Roundup OriginalMax	0.4 oz + 12 oz/ 22 oz	99	94	69	99	18.7	158	35.99	236
Checks									
Weedy Check	-	0	0	0	0	19.1	1	0.00	1
Weed-Free Check	-	100	100	100	100	18.8	142	0.00	244
POST I (V2 corn)									
Basis + Lumax + NIS	0.33 oz + 3.5 pt + 0.25%	87	99	98	99	19.2	160	32.12	242
Lumax + Touchdown Total + AMS	3 pt + 24oz + 2 qt	91	99	97	99	18.9	156	43.57	225
Lumax + Liberty + AMS	3 pt + 20oz + 2 qt	92	98	99	99	19.4	162	34.62	241
Steadfast + Lumax + NIS	0.75 oz + 2 pt + 0.25%	95	95	95	99	19.5	157	33.93	234
POST II (V3 corn)									
Option + Callisto + MSO + 28%N	1.5 oz + 1.5 oz + 1.5 pt + 3 pt	93	66	79	99	18.9	125	32.17	183
POST III (V4 corn)									
Steadfast+Callisto+atrazine+COC+AMS	0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	89	97	86	99	20.1	167	34.07	247
Resolve + Roundup OriginalMax + AMS	1 oz + 22 oz + 4.7 pt	99	95	75	97	20.0	169	32.23	253
Resolve + atrazine + Roundup OriginalMax + AMS	1 oz + 16 oz + 22 oz + 4.7 pt	99	96	76	99	19.8	173	33.51	260
	LSD (0.10)	3	3	6	1	0.8	40		65

2005 Corn Herbicide Evaluation - Waseca
Common Cocklebur Site

Herbicide	Rate	Giant foxtail	Common cocklebur	Common ragweed	H2O	Yield	Cost	Returns
Preemergence	(product/A)		(% control)		(%)	(bu/A)	($/A)	($/A)
Keystone LA + Hornet WDG	2.2 qt + 4oz	98	91	99	21.5	201	41.77	289
Lumax	6 pt	97	49	99	22.1	173	40.10	242
Preemergence/POST III (V4 corn)								
Surpass / Hornet + Callisto + atrazine + COC + AMS	2.75 pt / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	97	99	99	22.1	195	52.81	265
KIH-485 / Hornet + Callisto + atrazine + COC + AMS	8 oz / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	90	99	99	22.0	172	na	na
Outlook / Distinct + atrazine + NIS + AMS	21 oz / 4 oz + 16 oz + 0.25% + 2.5 lb	99	98	99	21.6	189	48.61	263
Define SC/ Liberty+atrazine+AMS	12 oz / 32 oz + 16 oz + 3.5 qt	97	95	99	22.0	192	42.66	271
Define SC/ Option+Distinct+MSO+28%	12 oz / 1.5 oz + 2 oz + 1.5 pt + 3 pt	99	92	97	23.1	188	47.76	254
Cinch/ Steadfast+Callisto+atrazine+COC+AMS	1 pt / 0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	99	94	99	22.3	189	52.84	253
Dual II Magnum/ Callisto+atrazine+COC+28%N	2 pt / 3 oz + 16 oz + 1% + 2.5%	97	99	99	22.1	192	54.69	259
Outlook/ Aim+atrazine+Clarity+NIS	21 oz / 0.5 oz + 16 oz + 3 oz + 0.25%	96	96	97	21.7	192	40.79	274
Harness/ Roundup WeatherMax+AMS	1.25 pt / 22 oz + 3 qt	99	92	99	21.6	200	47.85	281
Keystone LA / Glyphomax XRT + AMS	2.2 pt / 24 oz + 3 qt	99	96	98	22.6	191	44.00	264
Outlook/ Distinct + RoundupWeatherMax + NIS + AMS	12 oz / 3 oz + 11 oz + 0.25% + 3 qt	99	94	99	21.6	195	52.77	269
Basis + atrazine/ Roundup OriginalMax	0.4 oz + 12 oz/ 22 oz	97	94	98	22.0	196	35.99	284
Checks								
Weedy Check	-	0	0	0	22.3	24	0.00	38
Weed-Free Check	-	100	100	100	22.0	199	0.00	325
POST I (V2 corn)								
Basis + Lumax + NIS	0.33 oz + 3.5 pt + 0.25%	92	88	99	22.1	199	32.12	293
Lumax + Touchdown Total + AMS	3 pt + 24oz + 2 qt	99	95	99	22.3	195	43.57	274
Lumax + Liberty + AMS	3 pt + 20oz + 2 qt	99	91	99	21.7	205	34.62	301
Steadfast + Lumax + NIS	0.75 oz + 2 pt + 0.25%	98	82	96	21.8	193	33.93	282
POST II (V3 corn)								
Option + Callisto + MSO + 28%N	1.5 oz + 1.5 oz + 1.5 pt + 3 pt	98	92	93	21.9	195	32.17	287
POST III (V4 corn)								
Steadfast+Callisto+atrazine+COC+AMS	0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	97	92	99	21.9	192	34.07	280
Resolve + Roundup OriginalMax + AMS	1 oz + 22 oz + 4.7 pt	99	95	96	21.9	201	32.23	296
Resolve + atrazine + Roundup OriginalMax + AMS	1 oz + 16 oz + 22 oz + 4.7 pt	98	93	97	21.7	194	33.51	285
	LSD (0.10)	5	5	4	0.7	14		22

2005 Corn Herbicide Evaluation - Waseca
Common Ragweed Site

Herbicide	Rate	Giant foxtail	Common ragweed	Common lambsquarters	Redroot pigweed	H2O	Yield	Cost	Returns
Preemergence	(product/A)			(% control)		(%)	(bu/A)	($/A)	($/A)
Keystone LA + Hornet WDG	2.2 qt + 4oz	97	99	99	99	17.2	194	41.77	301
Lumax	6 pt	92	99	99	99	17.4	207	40.10	324
Preemergence/POST III (V4 corn)									
Surpass / Hornet + Callisto + atrazine + COC + AMS	2.75 pt / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	98	94	99	99	17.3	191	52.81	285
KIH-485 / Hornet + Callisto + atrazine + COC + AMS	8 oz / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	90	99	99	99	17.2	209	na	na
Outlook / Distinct + atrazine + NIS + AMS	21 oz / 4 oz + 16 oz + 0.25% + 2.5 lb	99	99	99	99	17.1	198	48.61	302
Define SC/ Liberty+atrazine+AMS	12 oz / 32 oz + 16 oz + 3.5 qt	99	99	99	99	17.3	209	42.66	327
Define SC/ Option+Distinct+MSO+28%	12 oz / 1.5 oz + 2 oz + 1.5 pt + 3 pt	98	99	99	99	17.2	176	47.76	263
Cinch/ Steadfast+Callisto+atrazine+COC+AMS	1 pt / 0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	99	99	99	99	17.6	196	52.84	292
Dual II Magnum/ Callisto+atrazine+COC+28%N	2 pt / 3 oz + 16 oz + 1% + 2.5%	96	99	99	99	17.4	189	54.69	279
Outlook/ Aim+atrazine+Clarity+NIS	21 oz / 0.5 oz + 16 oz + 3 oz + 0.25%	91	99	99	99	16.8	186	40.79	289
Harness/ Roundup WeatherMax+AMS	1.25 pt / 22 oz + 3 qt	99	99	99	99	17.3	188	47.85	284
Keystone LA / Glyphomax XRT + AMS	2.2 pt / 24 oz + 3 qt	99	99	99	99	17.2	190	44.00	292
Outlook/ Distinct + RoundupWeatherMax + NIS + AMS	12 oz / 3 oz + 11 oz + 0.25% + 3 qt	99	99	99	99	17.4	203	52.77	305
Basis + atrazine/ Roundup OriginalMax	0.4 oz + 12 oz/ 22 oz	98	99	99	99	17.2	209	35.99	333
Checks									
Weedy Check	-	0	0	0	0	17.3	144	0.00	254
Weed-Free Check	-	100	100	100	100	17.4	194	0.00	341
POST I (V2 corn)									
Basis + Lumax + NIS	0.33 oz + 3.5 pt + 0.25%	95	99	99	99	17.5	205	32.12	328
Lumax + Touchdown Total + AMS	3 pt + 24oz + 2 qt	97	99	99	99	17.6	208	43.57	322
Lumax + Liberty + AMS	3 pt + 20oz + 2 qt	99	99	99	99	17.7	190	34.62	299
Steadfast + Lumax + NIS	0.75 oz + 2 pt + 0.25%	98	99	99	99	17.6	212	33.93	338
POST II (V3 corn)									
Option + Callisto + MSO + 28%N	1.5 oz + 1.5 oz + 1.5 pt + 3 pt	96	99	99	99	17.8	206	32.17	329
POST III (V4 corn)									
Steadfast+Callisto+atrazine+COC+AMS	0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	99	99	99	99	17.6	210	34.07	335
Resolve + Roundup OriginalMax + AMS	1 oz + 22 oz + 4.7 pt	99	99	99	99	17.6	193	32.23	306
Resolve + atrazine + Roundup OriginalMax + AMS	1 oz + 16 oz + 22 oz + 4.7 pt	99	99	99	99	17.5	215	33.51	344
	LSD (0.10)	4	2	1	1	0.3	17		31

2005 Corn Herbicide Evaluation - Waseca
Giant Ragweed Site

Herbicide	Rate	Giant foxtail	Giant ragweed	Common cocklebur	Velvetleaf	H2O	Yield	Cost	Returns
Preemergence	(product/A)			(% control)		(%)	(bu/A)	($/A)	($/A)
Keystone LA + Hornet WDG	2.2 qt + 4oz	96	97	97	79	18.2	180	41.77	271
Lumax	6 pt	74	81	93	99	18.5	175	40.10	263
Preemergence/POST III (V4 corn)									
Surpass / Hornet + Callisto + atrazine + COC + AMS	2.75 pt / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	97	99	99	99	18.4	209	52.81	310
KIH-485 / Hornet + Callisto + atrazine + COC + AMS	8 oz / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	85	99	99	99	18.6	205	na	na
Outlook / Distinct + atrazine + NIS + AMS	21 oz / 4 oz + 16 oz + 0.25% + 2.5 lb	98	99	99	98	18.0	196	48.61	294
Define SC/ Liberty+atrazine+AMS	12 oz / 32 oz + 16 oz + 3.5 qt	99	99	99	98	18.7	198	42.66	300
Define SC/ Option+Distinct+MSO+28%	12 oz / 1.5 oz + 2 oz + 1.5 pt + 3 pt	99	99	99	97	18.4	196	47.76	293
Cinch/ Steadfast+Callisto+atrazine+COC+AMS	1 pt / 0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	98	99	99	99	18.6	187	52.84	271
Dual II Magnum/ Callisto+atrazine+COC+28%N	2 pt / 3 oz + 16 oz + 1% + 2.5%	86	99	99	99	18.3	200	54.69	292
Outlook/ Aim+atrazine+Clarity+NIS	21 oz / 0.5 oz + 16 oz + 3 oz + 0.25%	83	97	99	99	18.4	198	40.79	302
Harness/ Roundup WeatherMax+AMS	1.25 pt / 22 oz + 3 qt	99	98	99	97	18.4	207	47.85	311
Keystone LA / Glyphomax XRT + AMS	2.2 pt / 24 oz + 3 qt	99	99	99	98	18.5	191	44.00	287
Outlook/ Distinct + RoundupWeatherMax + NIS + AMS	12 oz / 3 oz + 11 oz + 0.25% + 3 qt	99	99	99	99	18.1	207	52.77	308
Basis + atrazine/ Roundup OriginalMax	0.4 oz + 12 oz/ 22 oz	97	99	99	97	18.5	199	35.99	309
Checks									
Weedy Check	-	0	0	0	0	18.7	74	0.00	127
Weed-Free Check	-	100	100	100	100	18.5	196	0.00	340
POST I (V2 corn)									
Basis + Lumax + NIS	0.33 oz + 3.5 pt + 0.25%	93	99	99	99	18.6	201	32.12	315
Lumax + Touchdown Total + AMS	3 pt + 24oz + 2 qt	98	99	99	99	18.6	210	43.57	319
Lumax + Liberty + AMS	3 pt + 20oz + 2 qt	98	99	99	98	18.4	204	34.62	320
Steadfast + Lumax + NIS	0.75 oz + 2 pt + 0.25%	96	99	99	99	18.7	207	33.93	322
POST II (V3 corn)									
Option + Callisto + MSO + 28%N	1.5 oz + 1.5 oz + 1.5 pt + 3 pt	93	99	99	98	18.5	199	32.17	313
POST III (V4 corn)									
Steadfast+Callisto+atrazine+COC+AMS	0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	98	99	99	99	18.5	211	34.07	332
Resolve + Roundup OriginalMax + AMS	1 oz + 22 oz + 4.7 pt	96	97	99	97	18.6	195	32.23	305
Resolve + atrazine + Roundup OriginalMax + AMS	1 oz + 16 oz + 22 oz + 4.7 pt	96	99	99	97	18.7	218	33.51	343
	LSD (0.10)	5	9	3	5	0.4	18		31

2005 Corn Herbicide Evaluation - Waseca
Tall Waterhemp Site

Herbicide	Rate	Giant foxtail	Tall waterhemp	Velvetleaf	Common lambsquarters	H2O	Yield	Cost	Returns
Preemergence	(product/A)			(% control)		(%)	(bu/A)	($/A)	($/A)
Keystone LA + Hornet WDG	2.2 qt + 4oz	98	99	97	99	18.8	205	41.77	310
Lumax	6 pt	79	91	81	99	19.1	205	40.10	311
Preemergence/POST III (V4 corn)									
Surpass / Hornet + Callisto + atrazine + COC + AMS	2.75 pt / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	98	99	99	99	18.4	211	52.81	313
KIH-485 / Hornet + Callisto + atrazine + COC + AMS	8 oz / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	94	99	99	99	18.6	206	na	na
Outlook / Distinct + atrazine + NIS + AMS	21 oz / 4 oz + 16 oz + 0.25% + 2.5 lb	99	99	99	99	18.0	200	48.61	300
Define SC/ Liberty+atrazine+AMS	12 oz / 32 oz + 16 oz + 3.5 qt	99	99	96	99	18.6	194	42.66	292
Define SC/ Option+Distinct+MSO+28%	12 oz / 1.5 oz + 2 oz + 1.5 pt + 3 pt	95	92	99	99	18.5	199	47.76	297
Cinch/ Steadfast+Callisto+atrazine+COC+AMS	1 pt / 0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	96	99	99	99	18.7	205	52.84	301
Dual II Magnum/ Callisto+atrazine+COC+28%N	2 pt / 3 oz + 16 oz + 1% + 2.5%	97	99	99	99	18.4	215	54.69	317
Outlook/ Aim+atrazine+Clarity+NIS	21 oz / 0.5 oz + 16 oz + 3 oz + 0.25%	89	99	92	97	19.0	202	40.79	306
Harness/ Roundup WeatherMax+AMS	1.25 pt / 22 oz + 3 qt	99	99	92	99	18.2	213	47.85	323
Keystone LA / Glyphomax XRT + AMS	2.2 pt / 24 oz + 3 qt	99	99	97	99	18.2	189	44.00	285
Outlook/ Distinct + RoundupWeatherMax + NIS + AMS	12 oz / 3 oz + 11 oz + 0.25% + 3 qt	99	99	98	99	18.2	203	52.77	301
Basis + atrazine/ Roundup OriginalMax	0.4 oz + 12 oz/ 22 oz	98	97	95	99	18.8	204	35.99	316
Checks									
Weedy Check	-	0	0	0	0	18.1	143	0.00	249
Weed-Free Check	-	100	100	100	100	18.7	201	0.00	346
POST I (V2 corn)									
Basis + Lumax + NIS	0.33 oz + 3.5 pt + 0.25%	95	99	99	99	18.1	211	32.12	335
Lumax + Touchdown Total + AMS	3 pt + 24oz + 2 qt	99	99	99	99	17.8	214	43.57	331
Lumax + Liberty + AMS	3 pt + 20oz + 2 qt	99	99	99	99	17.9	210	34.62	333
Steadfast + Lumax + NIS	0.75 oz + 2 pt + 0.25%	98	99	99	99	17.9	217	33.93	346
POST II (V3 corn)									
Option + Callisto + MSO + 28%N	1.5 oz + 1.5 oz + 1.5 pt + 3 pt	91	98	99	99	18.2	192	32.17	302
POST III (V4 corn)									
Steadfast+Callisto+atrazine+COC+AMS	0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	94	99	99	99	17.8	196	34.07	309
Resolve + Roundup OriginalMax + AMS	1 oz + 22 oz + 4.7 pt	97	97	99	96	17.7	192	32.23	305
Resolve + atrazine + Roundup OriginalMax + AMS	1 oz + 16 oz + 22 oz + 4.7 pt	99	99	99	98	18.1	200	33.51	316
	LSD (0.10)	5	5	6	1	0.6	13		22

2005 Corn Herbicide Evaluation - Lamberton

Herbicide	Rate	Yellow foxtail	Common lambsquarters	Redroot pigweed
Preemergence	(product/A)		(% control)	
Keystone LA + Hornet WDG	2.2 qt + 4oz	83	97	98
Lumax	6 pt	77	98	98
Preemergence/POST III (V4 corn)				
Surpass / Hornet + Callisto + atrazine + COC + AMS	2.75 pt / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	92	98	98
KIH-485 / Hornet + Callisto + atrazine + COC + AMS	8 oz / 3 oz + 0.75 oz + 8 oz + 1% + 3 qt	91	98	97
Outlook / Distinct + atrazine + NIS + AMS	21 oz / 4 oz + 16 oz + 0.25% + 2.5 lb	89	98	98
Define SC/ Liberty+atrazine+AMS	12 oz / 32 oz + 16 oz + 3.5 qt	86	98	98
Define SC/ Option+Distinct+MSO+28%	12 oz / 1.5 oz + 2 oz + 1.5 pt + 3 pt	92	98	97
Cinch/ Steadfast+Callisto+atrazine+COC+AMS	1 pt / 0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	88	98	98
Dual II Magnum/ Callisto+atrazine+COC+28%N	2 pt / 3 oz + 16 oz + 1% + 2.5%	92	98	98
Outlook/ Aim+atrazine+Clarity+NIS	21 oz / 0.5 oz + 16 oz + 3 oz + 0.25%	92	98	97
Harness/ Roundup WeatherMax+AMS	1.25 pt / 22 oz + 3 qt	84	97	98
Keystone LA / Glyphomax XRT + AMS	2.2 pt / 24 oz + 3 qt	87	98	98
Outlook/ Distinct + RoundupWeatherMax + NIS + AMS	12 oz / 3 oz + 11 oz + 0.25% + 3 qt	89	98	97
Basis + atrazine/ Roundup OriginalMax	0.4 oz + 12 oz/ 22 oz	79	98	95
Checks				
Weedy Check	-	0	0	0
Weed-Free Check	-	100	100	100
POST I (V2 corn)				
Basis + Lumax + NIS	0.33 oz + 3.5 pt + 0.25%	94	98	98
Lumax + Touchdown Total + AMS	3 pt + 24oz + 2 qt	92	98	97
Lumax + Liberty + AMS	3 pt + 20oz + 2 qt	95	98	97
Steadfast + Lumax + NIS	0.75 oz + 2 pt + 0.25%	88	98	97
POST II (V3 corn)				
Option + Callisto + MSO + 28%N	1.5 oz + 1.5 oz + 1.5 pt + 3 pt	75	98	98
POST III (V4 corn)				
Steadfast+Callisto+atrazine+COC+AMS	0.75 oz + 2 oz + 16 oz +1% + 4.7 pt	86	98	98
Resolve + Roundup OriginalMax + AMS	1 oz + 22 oz + 4.7 pt	84	98	96
Resolve + atrazine + Roundup OriginalMax + AMS	1 oz + 16 oz + 22 oz + 4.7 pt	85	98	97
	LSD (0.10)	6	1	1

Weed emergence patterns and the effect of time of weed removal on corn yield at Potsdam, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Tom Hoverstad and Jeffrey L. Gunsolus

The objective of this trial was to evaluate weed emergence patterns and the effect of time of weed removal on corn yield in southeastern Minnesota. The research site was a Port Byron silt loam containing 3.2% organic matter with a pH of 6.6 and soil test P and K levels of 65 ppm and 294 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 144 lb/A nitrogen, 23 lb/A phosphorus, 120 lb/A potash, and 24 lb/A sulfur. The field was disked and field cultivated twice prior to planting. The corn hybrid, Pioneer 38H69 was planted on May 6, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. Preemergence (PRE) and postemergence (POST I, POST II, POST III, POST IV, and POST V) treatments were applied with a tractor-mounted sprayer, delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Application dates, environmental conditions, and crop and weed stages are listed below.

CONCLUSIONS: Timing of weed removal is a critical factor in maximizing corn yields. At this location, wild proso millet and common lambsquarters were the primary weeds. PRE / POST applications of Harness at 1.25 pt/A followed by Roundup WeatherMax at 22 oz/A applied from 3 inch through 9 to 12 inch weeds maximized yield and minimized risk. The two-pass PRE/POST system reduced overall risk by providing early season weed control (reduced competition) and by extending the application window of the POST treatment before yield losses occurred. POST I applications that included a residual herbicide, Lumax + Touchdown Total or Harness + Roundup WeatherMax, provided season long weed control and maximized yield.

Timing of a one-pass application of Roundup WeatherMax was critical in this trial. Yields were significantly reduced when applied too late, 7 inch or greater weeds. A delay by only 7 days from POST III to POST V, resulted in a 28 bu/A yield reduction. When compared to the PRE/POST systems or the two-pass POST system, the yield was 40 bu/A less than the top treatment in this trial.

Date	May 6	June 7	June 13	June 16	June 20	June 23
Treatment	PRE	POST I	POST II	POST III	POST IV	POST V
Temperature (F)						
air	73	92	70	69	85	90
soil	50		60	65	65	80
Relative humidity (%)	31	48	78	43	47	46
Wind (mph)	7	18	13	8	17	20
Soil Moisture	dry	adequate	wet	adequate	dry	adequate
Cloud cover (%)	10	50	99	0	10	15
Corn						
stage	seeded	V3	4 collar	4 collar	5 collar	7 collar
height (inch)	--	5.6	9.3	13.8	23.0	26.4
Common lambsquarters						
weed density (ft^2)	--	49.9	49.9	49.9	49.9	49.9
height (inch)	--	1.1	3.5	5.3	11.9	16.8
Velvetleaf						
weed density (ft^2)	--	2.6	2.6	2.6	2.6	2.6
height (inch)	--	1.6	3.5	4.6	9.9	15.8
Wild proso millet						
weed density (ft^2)	--	58.4	58.4	58.4	58.4	58.4
height (inch)	--	0.9	3.5	6.5	10.9	14.5
Rainfall after application (in)						
week 1	1.28	1.89	0.25	0.15	1.14	1.23
week 2	1.63	0.2	1.14	1.23	0.16	0.17
week 3	0.5	1.14	0.16	0.07	0.0	0.0

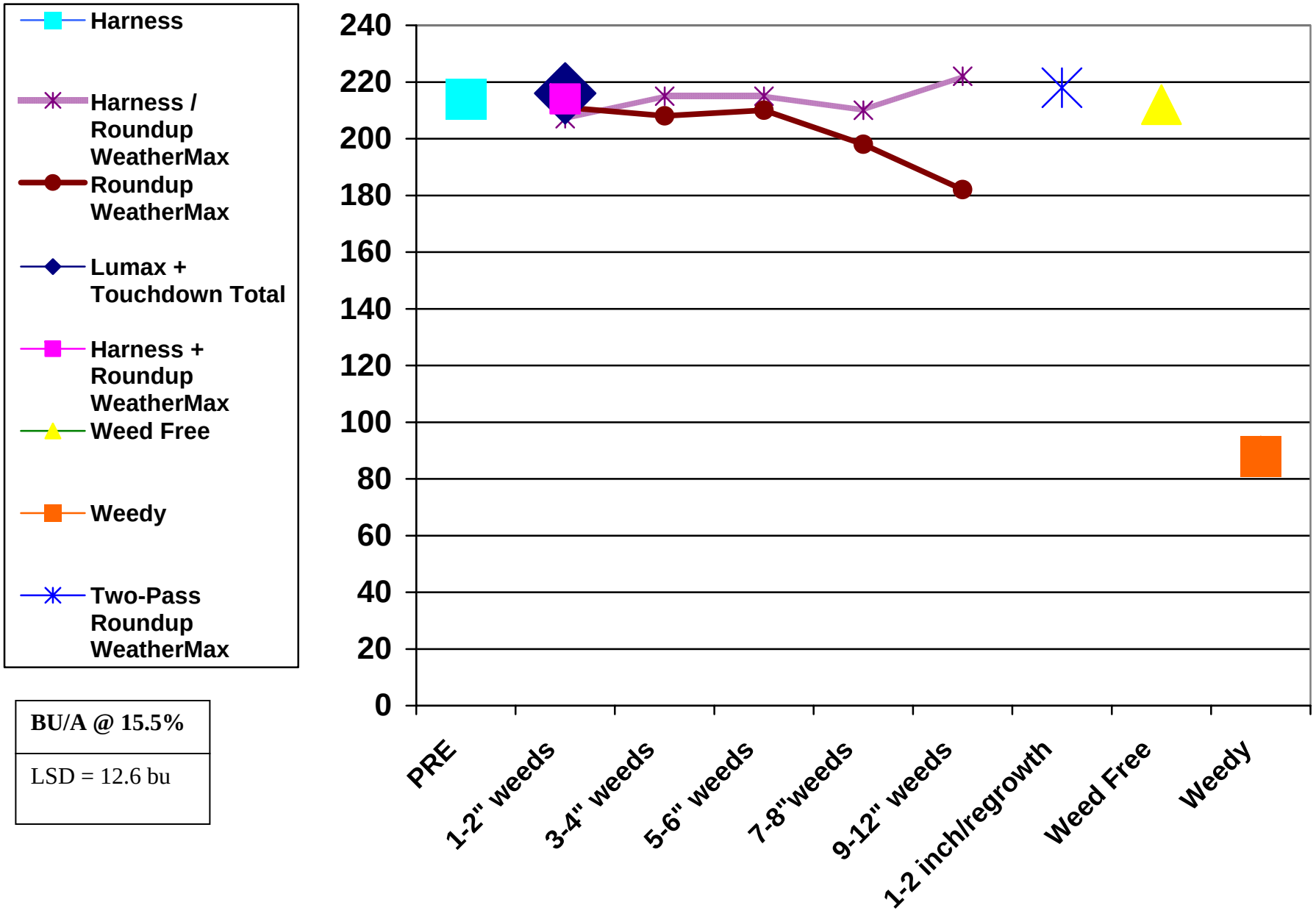
Harness alone at 1.25 pt/A provided excellent wild proso millet control and moderate broadleaf control. Based on weed species and density at Potsdam, there was no impact on yield. This would be different with other weeds, as noted in 2004 at Rochester when giant ragweed was the primary weed species and the Harness at 1.25 pt/A resulted in only 3 bu/A, see pg. E-27. It is extremely important to know the weed species and densities when planning herbicide programs.

In the combined location study, pg E-29, Lamberton, Morris, Rochester, and Waseca, the PRE / POST III sequential applications of Harness followed by Roundup WeatherMax, gave the best economic returns, (5-6 inch weeds, average over all locations). The two pass Roundup WeatherMax system can work, but it has more time management risk than the PRE / POST III (5-6 inch weeds) program. The one-pass Roundup WeatherMax treatments did not maximize yield or returns and the longer the duration of weed competition, the greater the impact on yield. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table. Effect of time of weed removal on corn yield at Potsdam, MN in 2005.

Treatment[a]	Rate	Application Time Weed Height	Corn moisture	Corn yield[b]	c
	(rate/A)	(inch)	(%)	(bu/A)	
PRE					
Harness	1.25 pt	0	19.6	214	ab
PRE / POST I					
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	1-2 inch	19.9	207	bc
POST I					
Roundup WeatherMax + AMS	22 oz + 2.5 lb	1-2 inch	20.4	211	ab
Lumax + Touchdown Total + AMS	3 pt + 24 oz + 2.5 lb	1-2 inch	19.6	216	ab
Harness + Roundup WeatherMax + AMS	1.25 pt + 22 oz + 2.5 lb	1-2 inch	20.1	214	ab
PRE / POST II					
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	3-4 inch	20.6	215	ab
POST II					
Roundup WeatherMax + AMS	22 oz + 2.5 lb	3-4 inch	19.9	208	bc
PRE / POST III					
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	5-6 inch	20.4	215	ab
POST III					
Roundup WeatherMax + AMS	22 oz + 2.5 lb	5-6 inch	20.6	210	abc
PRE / POST IV					
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	7-8 inch	20.3	210	abc
POST IV					
Roundup WeatherMax + AMS	22 oz + 2.5 lb	7-8 inch	20.4	198	c
PRE / POST V					
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	9-12 inch	20.3	222	a
POST V					
Roundup WeatherMax + AMS	1.5 pt / 22oz + 2.5 lb	9-12 inch	19.6	182	d
POST II / POST VI					
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 2.5 lb / 22 oz + 2.5 lb	3-4 inch / regrowth	20.3	218	ab
Weed-free Check			20.4	212	ab
Weedy Check			20.3	88	e
LSD (P=0.10)			0.7	**13**	

a. AMS = spray grade ammonium sulfate, b. Yield at 15.5% moisture, c. Yields followed by the same letter do not significantly differ from each other.



BU/A @ 15.5%
LSD = 12.6 bu

Effect of weed emergence and timing of weed removal on corn yield at Rochester, MN in 2004. Breitenbach, Fritz R., Lisa M. Behnken, Thomas R. Hoverstad and Jeffrey L. Gunsolus. The objective of this trail was to determine the effect of weed emergence and timing of weed removal on corn yield in southeastern Minnesota. The research site was a Lawler loam series containing 2.7% organic matter with a pH test of 6.5 and soil test P and K levels of 43 ppm and 185 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 122 lb/A nitrogen, 23 lb/A phosphorus, 120 lb/A potash, 23 lb/A sulfur and 3 T/A of lime. The area was topdressed with 40 lb/A of nitrogen on June 15. The field was disked and field cultivated once prior to planting. The corn hybrid, DKC 47-10, was planted on April 29, 2004 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. 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 crop and weed stages are listed below.

Date	April 29	May 20	June 2	June 7	June 14	June 18	June 28
Treatment	PRE	POST I	POST II	POST III	POST IV	POST V	POST VI
Temperature (F)							
Air	61	71	67	91	73	61	72
Relative humidity (%)	49	59	49	43	57	59	44
Wind (mph)	13	14	12	29	13	18	9
Corn							
stage	--	V1	V2	V4	V5	V6	6-7 collar
height (inches)	--	3.0	4.0	5.4	14.0	15.0	17.0
Giant ragweed							
weed density	--	heavy	heavy	heavy	heavy	heavy	heavy
height (inch)	--	0.5	4.6	10.8	13.0	15.0	2-4 regrowth
Common lambsquarters							
weed density	--	light	light	light	light	light	light
height (inch)	--	0.5	1.4	3.0	4.0	5.0	2-4 regrowth
Common waterhemp							
weed density	--	moderate	moderate	moderate	moderate	moderate	moderate
height (inch)	--	0.0	1.4	0.75	2.5	3.0	2-4 regrowth
Giant foxtail							
weed density	--	moderate	moderate	moderate	moderate	moderate	moderate
height (inch)	--	0.5	1.0	4.3	5.0	5.5	2-4 regrowth
Rainfall after application (in)							
week 1	0.01	2.91	0.20	5.65	1.85	0.38	0.16
week 2	1.44	1.30	5.46	1.85	0.63	0.26	2.82
week 3	1.02	4.32	1.92	0.63	1.68	1.73	0.23

CONCLUSIONS:

Different weeds emerge at different times during the growing season. Timing of weed removal is a critical factor in maximizing corn yields. At this location (a high giant ragweed population), the sequential POST II / POST VI applications of Roundup WeatherMax and Harness followed by Roundup WeatherMax at POST III (5 inch weeds) maximized yield, 156 and 150 bu/A, respectively. When weeds were removed too early, treatments 1 and 2, later emerging weeds caused enough competition to substantially reduce corn yields. When removed too late, treatments 9 and 10, early season competition caused a substantial reduction in corn yield.

In the combined location study, Lamberton, Morris, Rochester, and Waseca, the one-pass Roundup WeatherMax treatments did not maximize yield or returns. The PRE / POST sequential applications of Harness followed by Roundup WeatherMax, gave the best economic returns (average over all locations). The two pass Roundup WeatherMax system resulted in the highest yield, but has more economic risk than PRE / POST III (5 inch weeds), which also resulted in top yields. (University of Minnesota Extension Service, Regional Center, Rochester, MN)

Table. Effect of time of weed removal on corn yield at Rochester, MN in 2004 (Breitenbach, Behnken, Hoverstad and Gunsolus).

Trt number	Treatment	Rate/A	Post application weed height (inches)	Corn yield (bu/A)
	PRE			
11	Harness	1.25 pt		3
	PRE / POST I			
1	Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	1	27
	POST I			
2	Roundup WeatherMax + AMS	22 oz + 2.5 lb	1	33
	PRE / POST II			
3	Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	3	134
	POST II			
4	Roundup WeatherMax + AMS	22 oz + 2.5 lb	3	128
	PRE / POST III			
5	Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	5	150
	POST III			
6	Roundup WeatherMax + AMS	22 oz + 2.5 lb	5	130
	PRE / POST IV			
7	Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	7	128
	POST IV			
8	Roundup WeatherMax + AMS	22 oz + 2.5 lb	7	122
	PRE / POST V			
9	Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 2.5 lb	9	94
	POST V			
10	Roundup Weathermax + AMS	22 oz + 2.5 lb	9	48
	POST II / POST VI			
12	Roundup WeatherMax + AMS /Roundup WeatherMax + AMS	22 oz + 2.5 lb / 22 oz + 2.5 lb	3 / 2-4 regrowth	156
	LSD (0.10)			**18**

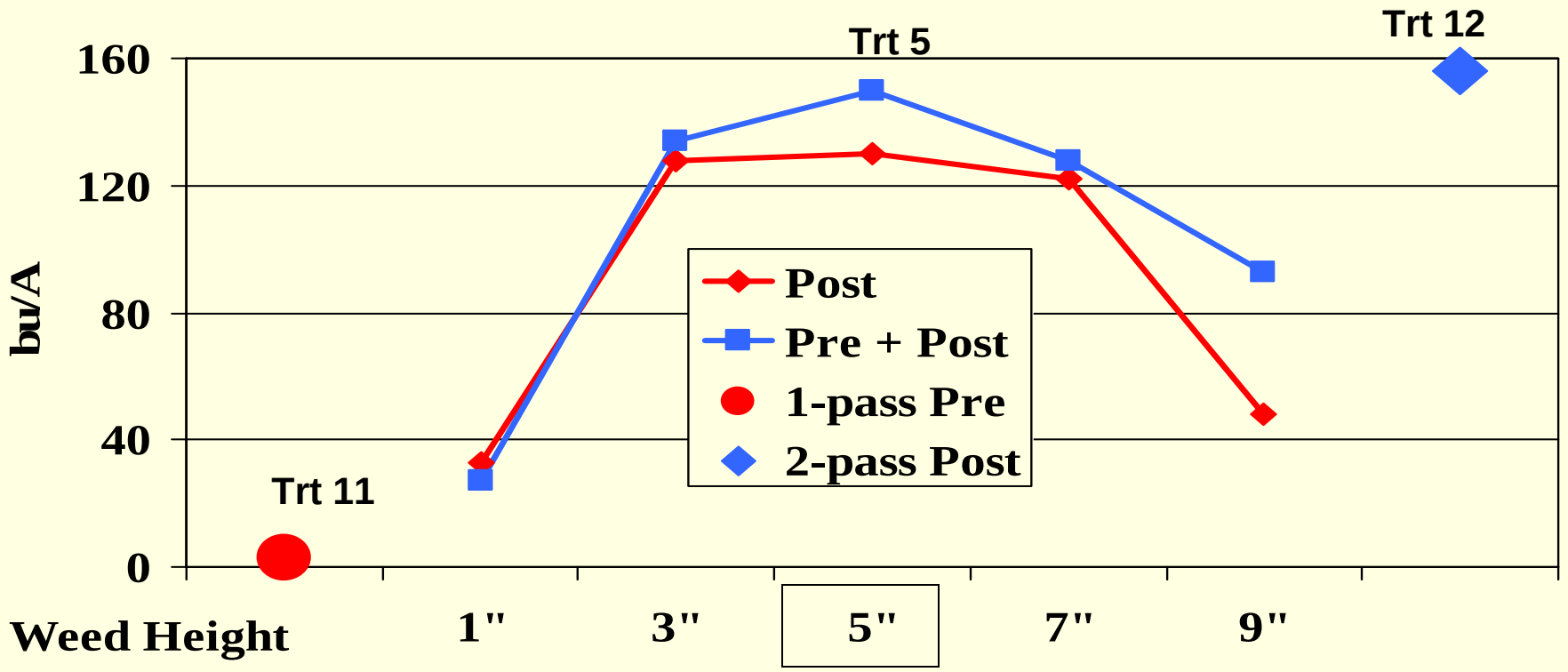
Weed Emergence Patterns and the Effect of Time of Weed Removal on Corn Yield in 2004 and 2005

- **In 2004 & 2005, research compared 5 glyphosate timings (1”, 3”, 5”, 7” and 9” weed heights), with and without a ½-rate of a PRE herbicide, on crop yield and economic returns. Studies were conducted at four locations in 2004 and five locations in 2005.**

- **Major Weed Species at each location:**
- **Lamberton (04/05):** Yellow foxtail, Common lambsquarters, Redroot pigweed
- **Luverne (05):** Giant foxtail, Common lambsquarters, Tall waterhemp
- **Morris (04/05):** Green foxtail, common lambsquarters, Powell amaranth, wild mustard
- **Potsdam (05):** Wild proso millet, Common lambsquarters, Velvetleaf
- **Rochester (04):** Giant foxtail, Giant ragweed, Common waterhemp, common lambsquarters
- **Waseca (04/05):** Giant foxtail, Common ragweed, Common lambsquarters, Velvetleaf & Reroot pigweed (04) & Common cocklebur (05)
- **University of Minnesota Cooperators**:
  Jeffrey Gunsolus, Fritz Breitenbach, Lisa Behnken, Tom Hoverstad, Jodie Getting, and George Nelson

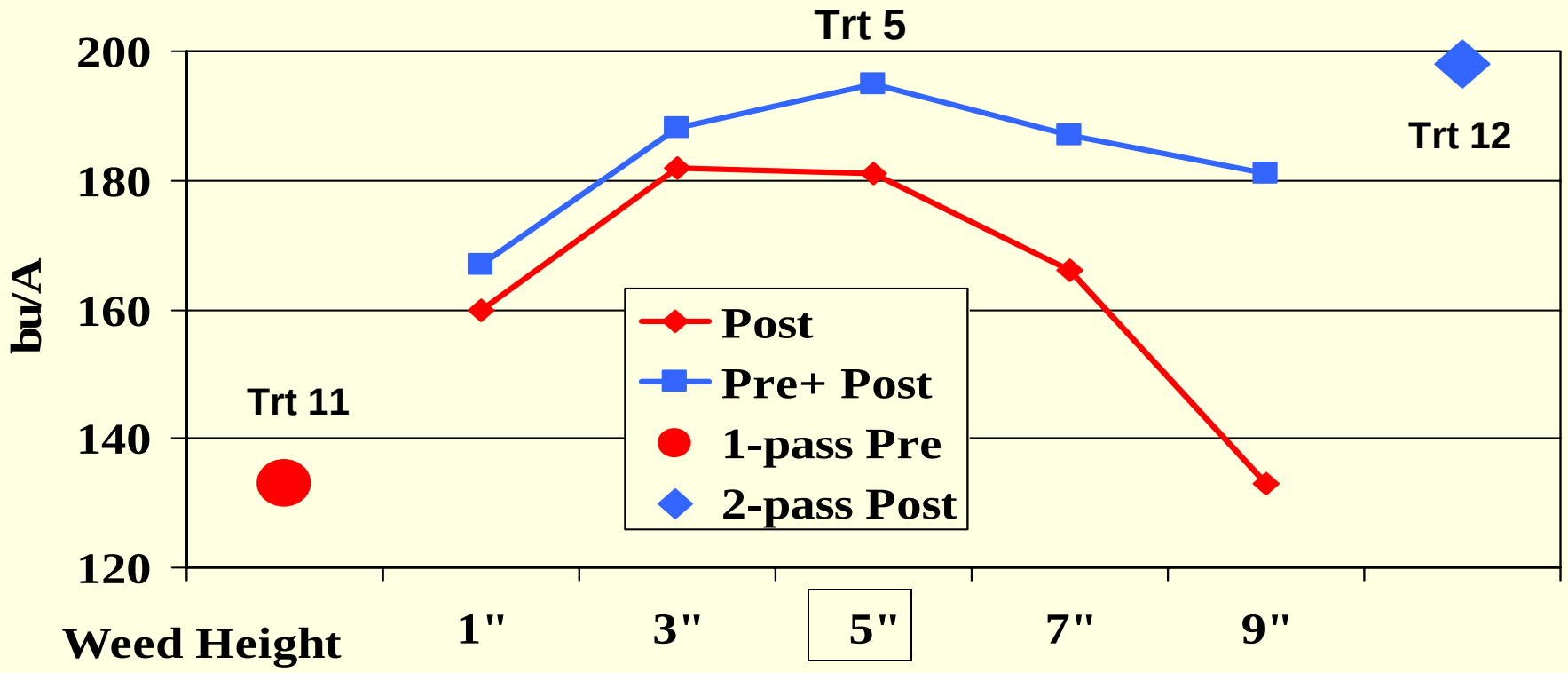
Glyphosate Timing and Corn Yield Rochester, 2004

(heavy giant ragweed pressure)



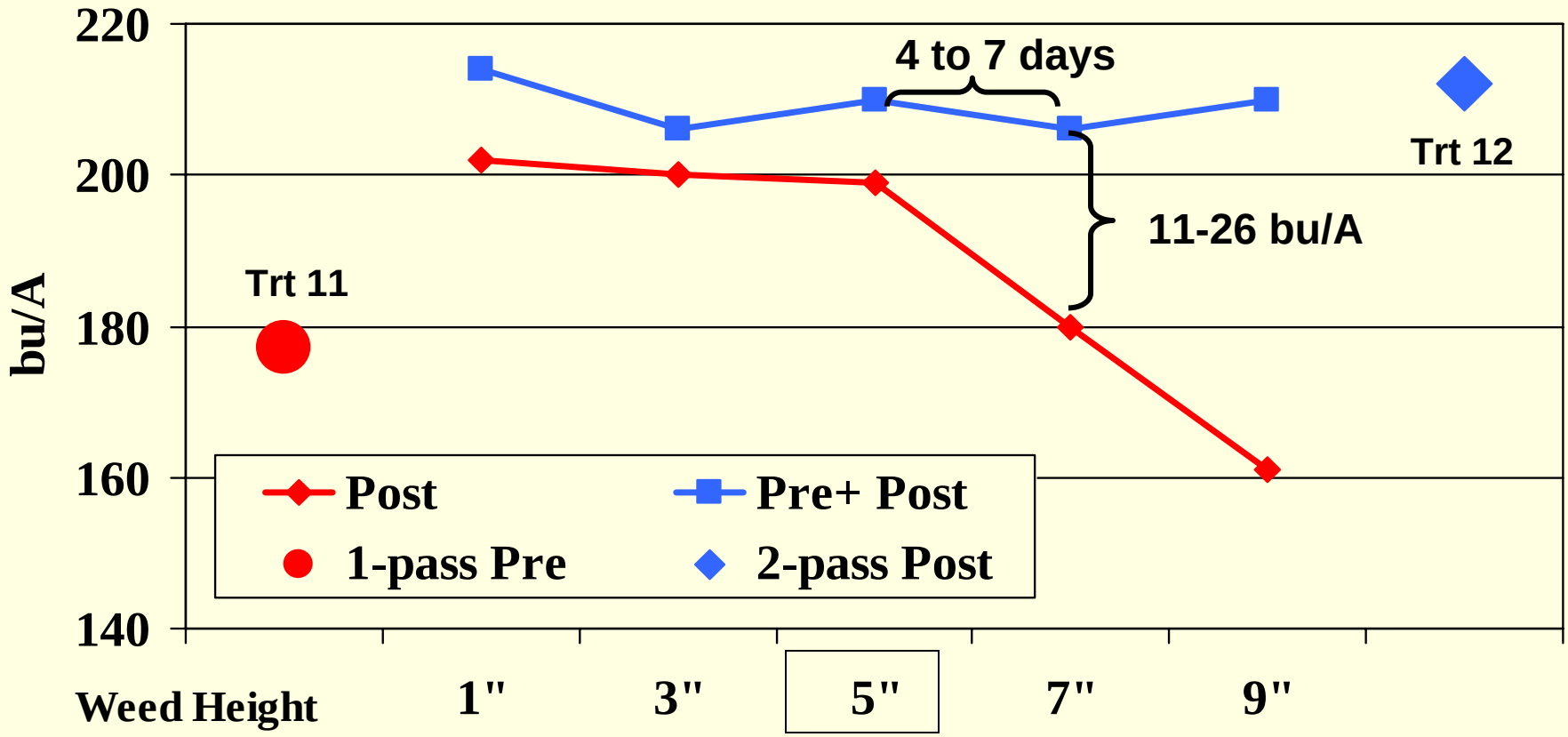
POST = Roundup WeatherMax (22 oz/A)
PRE + POST = Harness (1.25 pt/A) / Roundup WeatherMax (22 oz/A) + AMS
Trt 5 = Harness (1.25 pt/A) / Roundup WeatherMax (22 oz/A) + AMS at 5 inch weeds
Trt 11 = Harness PRE (1.25 pt/A)
Trt 12 = Roundup WeatherMax + AMS / Roundup WeatherMax + AMS at 3"/ 2-4" regrowth

Glyphosate Timing and Corn Yield Across Locations, 2004



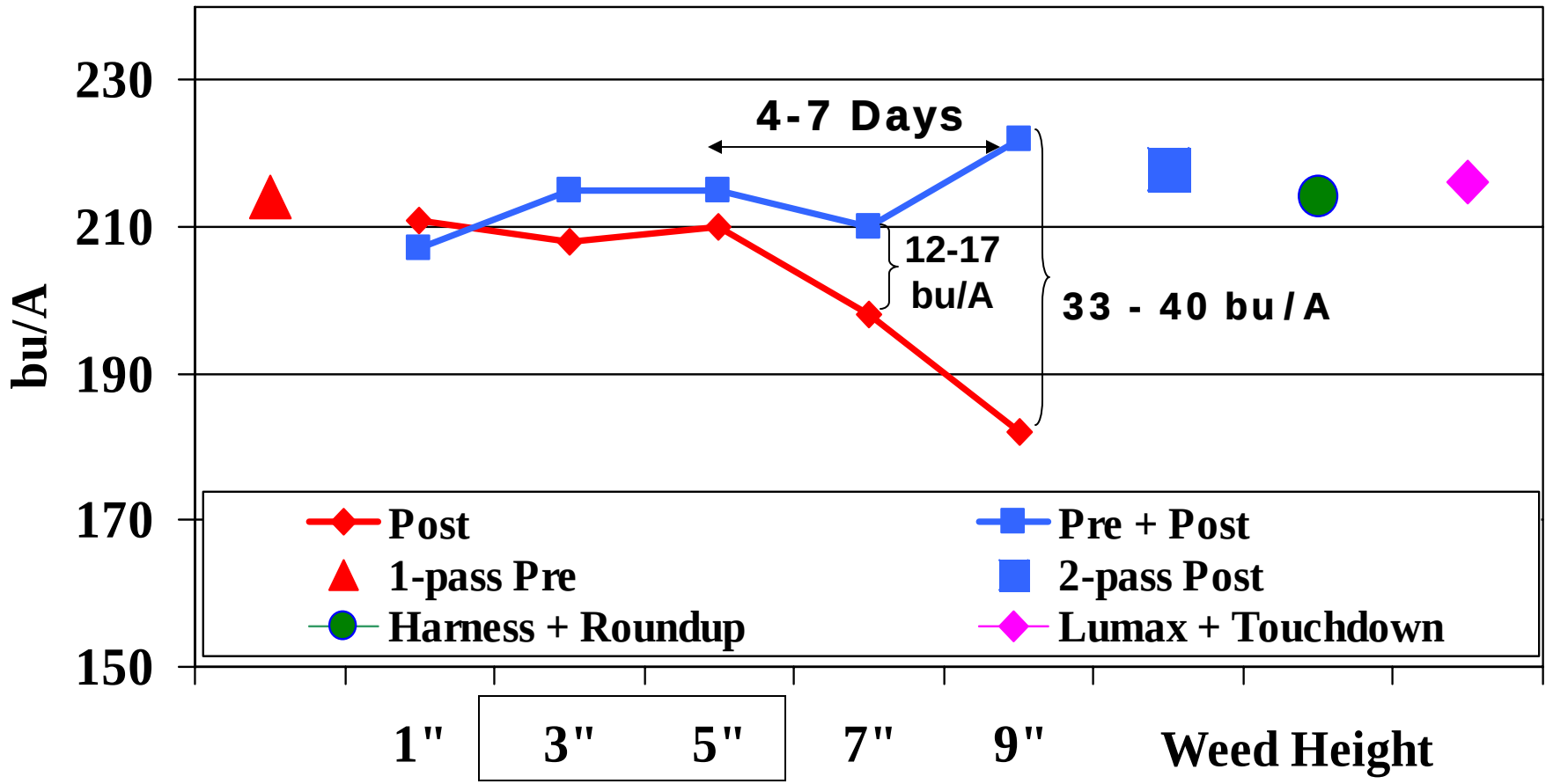
POST = Roundup WeatherMax (22 oz/A)
PRE + POST = Harness (1.25 pt/A) / Roundup WeatherMax (22 oz/A) + AMS
Trt 5 = Harness (1.25 pt/A) / Roundup WeatherMax (22 oz/A) + AMS at 5 inch weeds
Trt 11 = Harness PRE (1.25 pt/A)
Trt 12 = Roundup WeatherMax + AMS / Roundup WeatherMax + AMS at 3"/ 2-4" regrowth

Glyphosate Timing and Corn Yield Across Locations, 2004 (Excluding Rochester)



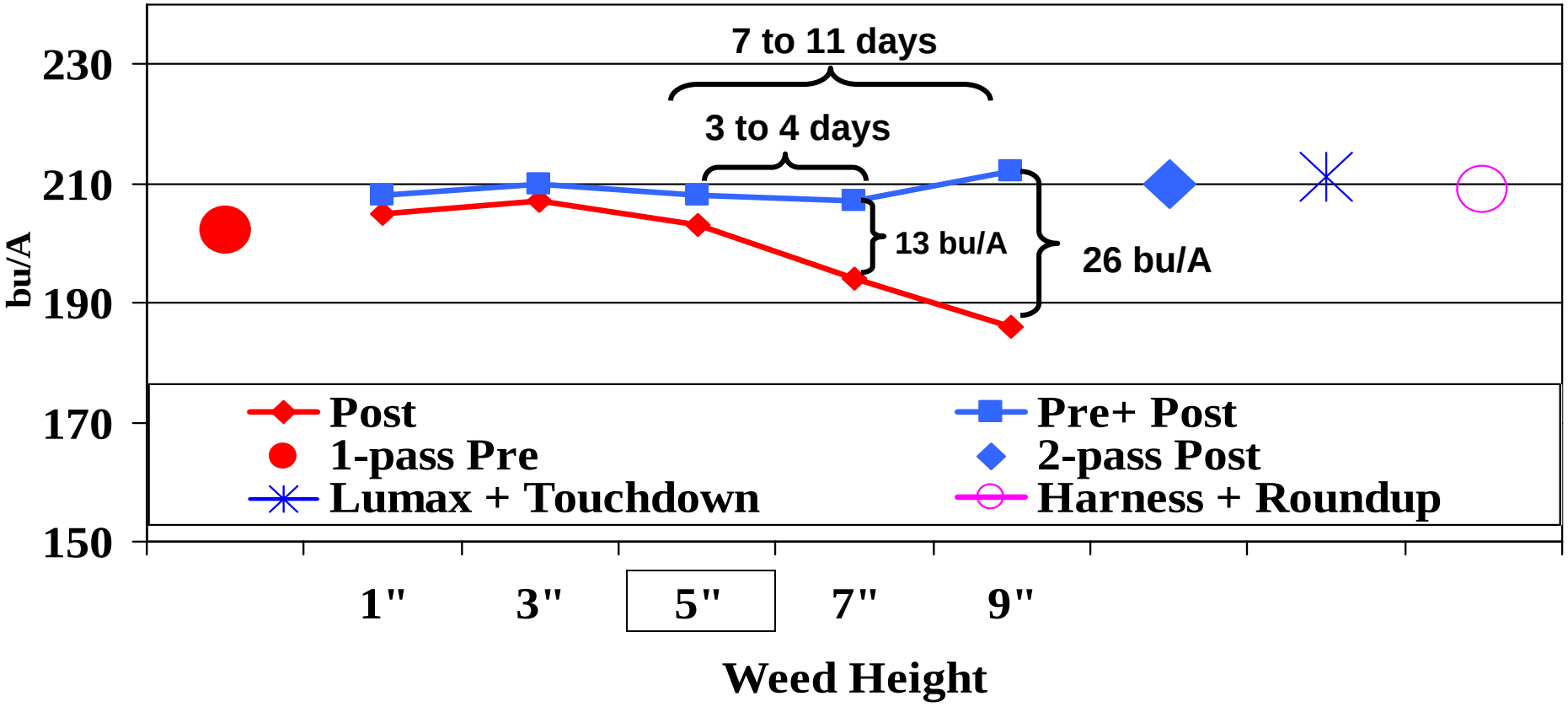
POST = Roundup WeatherMax (22 oz/A)
PRE + POST = Harness (1.25 pt/A) / Roundup WeatherMax (22 oz/A) + AMS
Trt 11 = Harness PRE (1.25 pt/A)
Trt 12 = Roundup WeatherMax + AMS / Roundup WeatherMax + AMS at 3"/ 2-4" regrowth

Corn Yield at Potsdam 2005



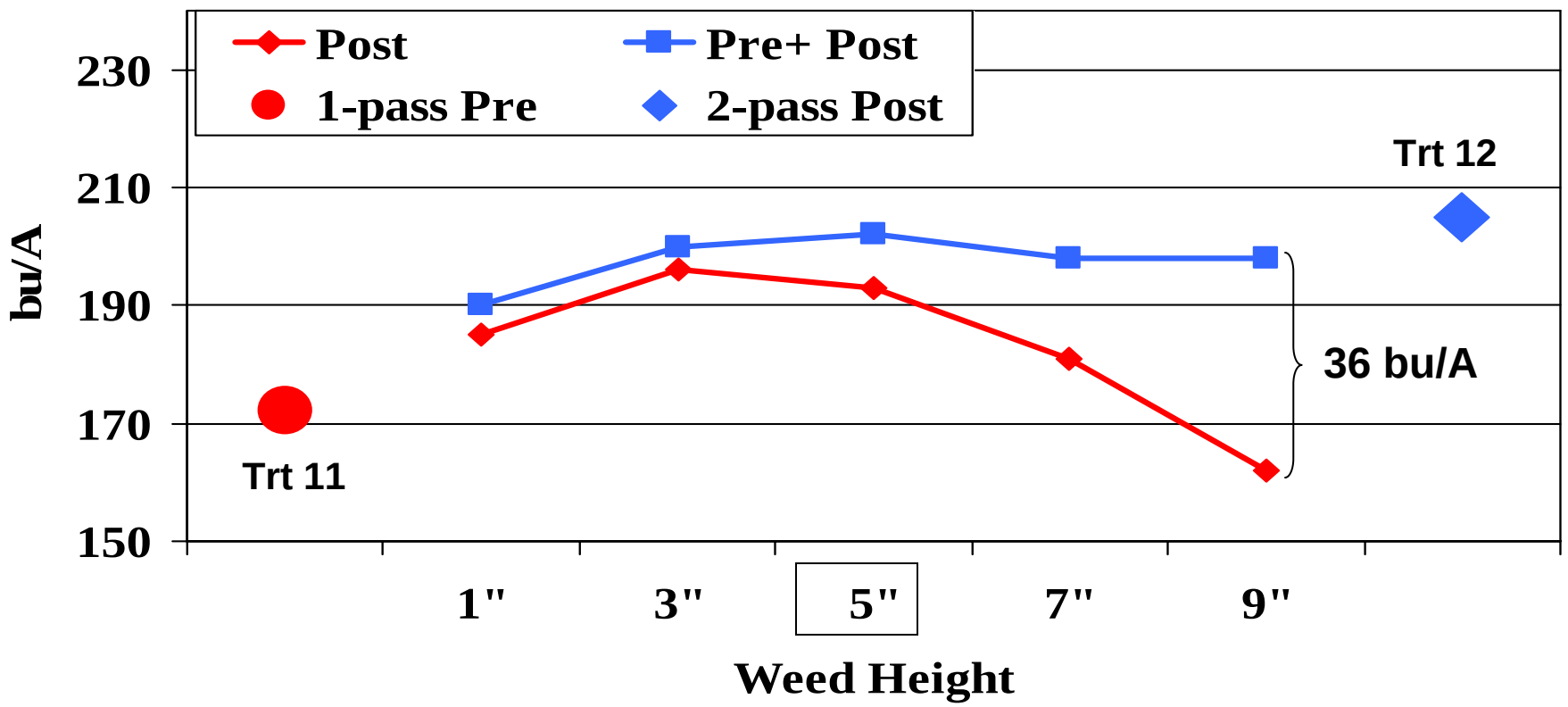
Post = Roundup WeatherMax (22 oz/A)
Pre + Post = Harness (1.25 pt/A) / Roundup WeatherMax (22 oz/A) + AMS
One pass Pre = Harness (1.25 pt/A)
Two pass Post = Roundup WeatherMax + AMS / Roundup WeatherMax + AMS at 3"/ 2-4" regrowth
Post at 1" weeds = Lumax (3 pt/A) + Touchdown Total (24 oz/A)
Post at 1" weed = Harness (1.25 pt/A)

Glyphosate Timing and Corn Yield Across Locations 2005



Post = Roundup WeatherMax (22 oz/A)
Pre + Post = Harness (1.25 pt/A) / Roundup WeatherMax (22 oz/A) + AMS
One pass Pre = Harness (1.25 pt/A)
Two pass Post = Roundup WeatherMax + AMS / Roundup WeatherMax + AMS at 3"/ 2-4" regrowth
Post at 1" weeds = Lumax (3 pt/A) + Touchdown Total (24 oz/A)
Post at 1" weeds = Harness (1.25 pt/A) + Roundup WeatherMax (22 oz/A)

Glyphosate Timing and Corn Yield Across Locations 2004-2005



Post = Roundup WeatherMax (22 oz/A)
Pre + Post = Harness (1.25 pt/A) / Roundup WeatherMax (22 oz/A) + AMS
Trt 11 = Harness PRE (1.25 pt/A)
Trt 12 = Roundup WeatherMax + AMS / Roundup WeatherMax + AMS at 3"/ 2-4" regrowth

Corn
2004 & 2005 Summary

- ⇨ **One-pass glyphosate does not maximize yield or returns.**
- ⇨ **The longer the duration of competition the greater the impact on yield.**
- ⇨ **PRE / POST (at 5 inch weeds) systems gave the best economic returns.**
- ⇨ **Two pass glyphosate can work but has more time management risk than PRE / POST (5 inch weeds).**
- ⇨ **One pass (1 inch weeds) Lumax + Touchdown Total or Harness + Roundup WeatherMax can maximize yield.**

HERBICIDE EVALUATION

SOYBEAN

Evaluation of Targa for control of volunteer glyphosate resistant corn in soybean at Rochester, Minnesota in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Matthew M. White, and Kira L. Stearns

The objective of this trial was to evaluate the performance of Targa for control of volunteer glyphosate resistant corn in soybean in southeastern Minnesota. The research site was a Lawler loam series containing 3.2% organic matter with a pH of 6.8 and soil test P and K levels of 52 ppm and 154 ppm, respectively. The previous crop was corn. The field was chisel plowed in the fall, spring disked and field cultivated twice before planting. The soybean variety, AgVenture PS 4192 RR, was planted on May 27, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. A randomized complete block design with four replications was used. 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 22, June 30, and July 6. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	May 27	June 16
Treatment	PRE	POST
Temperature (F)		
air	52	74
soil	59	70
Relative humidity (%)	80	44
Wind (mph)	16	6
Soil Moisture	adequate	adequate
Cloud cover (%)	100	10
Soybean		
stage	seeded	V1
height (inch)	--	4.2
Giant Foxtail		
weed density (ft^2)	--	moderate
height (inch)	--	3.8
Corn		
weed density (ft^2)	--	moderate
height (inch)	--	6.8
Rainfall after application (inch)		
week 1	0.25	0.15
week 2	1.71	2.04
week 3	0.54	0.70

CONCLUSIONS

Targa caused injury to soybean at both rates, 5 oz/A and 10 oz/A, compared to no injury from the other treatments. Injury increased from 10% to 25% as rate of Targa increased from 5 oz/A to 10 oz/A. Control of giant foxtail was similar among treatments with PRE applications of FirstRate followed by POST applications of Targa or Select. Targa + Roundup WeatherMax provided the best giant foxtail control on June 22, 100% compared to 64% for all other treatments. However, by July 7, the FirstRate + Targa or Select resulted in similar control. Control of volunteer glyphosate resistant corn was similar for Targa at 10 oz/A, and Select, 85 and 88%, respectively, and greater than Targa at 5.0 oz/A, June 22 rating. By the June 30 and July 6 rating dates, all Targa and Select treatments achieved 100% control of the volunteer glyphosate resistant corn. (University of Minnesota Extension Service, Regional Center, Rochester, MN)

Table. Performance of Targa for control of volunteer glyphosate resistant corn in soybean on June 22, June 30, and July 6 at Rochester, MN in 2005.

Treatment[a]	Rate	Injury	Giant foxtail control			Glyphosate resistant corn control		
		6/22	6/22	6/30	7/6	6/22	6/30	7/6
	(rate/A)	(%)	(%)			(%)		
Preemergence								
FirstRate	0.6 oz	0	64	57	69	6	56	53
Preemergence / Postemergence								
FirstRate / Targa + COC + AMS	0.6 oz / 5 oz + 1% + 2 lb	10	64	92	94	68	100	100
FirstRate / Targa + COC + AMS	0.6 oz / 10 oz + 1% + 2 lb	25	64	92	97	85	100	100
FirstRate / Select + COC + AMS	0.6 oz / 8 oz + 1% + 2 lb	0	64	92	95	88	100	100
Postemergence								
Targa + Roundup WeatherMax + NIS + AMS	5 oz + 22 oz + 0.125% + 2 lb	0	100	97	95	69	100	100
Untreated		0	0	0	0	0	0	0
LSD (P=0.10)		0	3	8	8	8	7	3

a. COC = crop oil concentrate, Helena, AMS = spray grade ammonium sulfate; NIS = AGRI-DEX nonionic surfactant, Helena.

Evaluation of the performance of weed control with an RR and STS stacked soybean system at Potsdam, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Angela L. White, and Matthew M. White

The objective of this trial was to evaluate weed control with an RR and STS stacked soybean system in southeastern Minnesota. The research site was a Port Byron silt loam with a pH test of 6.7 and soil test P and K levels of 65 ppm and 273 ppm, respectively. The previous crop was corn. The field was field cultivated twice prior to planting. The soybean hybrid, Garst 1827RR/STS, was planted on May 24, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. A randomized complete block design with four replications was used. Postemergence (POST I) 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 8, July 14, July 29 and September 30. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	July 1
Treatment	POST I
Temperature (F)	
Air	68
Relative humidity (%)	58
Wind (mph)	7
Soil moisture	Dry
Soybean	
stage	V5
height (inch)	10
Wild proso millet	
weed density (ft^2)	10.0
height (inch)	9.0
Common lambsquarters	
weed density (ft^2)	2.4
height (inch)	2.8
Velvetleaf	
weed density (ft^2)	0.6
height (inch)	7.8
Rainfall after application (inch)	
week 1	0.07
week 2	0
week 3	1.54

CONCLUSIONS

Very slight injury was detected with the Harmony GT, Classic, Harmony GT + Classic, Classic + Select, and with Roundup WeatherMax treatments applied alone or in a tank mix with Harmony GT and/or Classic. Extreme treatments had a significantly higher percent of injury. Extreme injury increased significantly when tank mixed with either Harmony GT or Classic and injury was most pronounced when tank mixed with Harmony GT. However, soybean yield was not impacted by crop injury.

Significantly lower wild proso millet control was achieved with the Harmony GT + Classic + Select treatment on all ratings.

Common lambsquarters control was significantly lower in the Harmony GT + Classic + Select treatment on the July 8 and July 14 rating dates. Significantly reduced common lambsquarters control was also observed in the Extreme treatment on the July 8 rating. Common lambsquarters control with Extreme increased significantly when tank mixed with Harmony GT compared to Extreme applied alone or tank mixed with Classic. The addition of Harmony GT and/or Classic to Roundup WeatherMax did not significantly improve common lambsquarters control.

All treatments provided excellent velvetleaf control on the July 14 and 29 rating dates. Early season weed control differences did not result in differences in soybean yields. (University of Minnesota Extension Service, Regional Center, Rochester)

Table. Performance of weed control with an RR and STS stacked soybean system on July 8, July 14 and July 29 at Potsdam, MN in 2005.

Treatment[a]	Rate	Injury	Wild proso millet control			Common lambsquarters control			Velvetleaf control			Soybean yield[b]
			7/8	7/14	7/29	7/7	7/24	7/29	7/8	7/14	7/29	
	(lb/A)	(%)	(%)			(%)			(%)			(bu/A)
POST I												
Roundup WeatherMax + AMS	22 oz + 3 lb	5	99	99	98	97	96	97	98	99	99	56
Roundup WeatherMax + Harmony GT + AMS	22 oz + 0.08 oz + 3 lb	5	99	99	99	97	96	96	98	99	99	57
Roundup WeatherMax + Harmony GT + AMS	22 oz + 0.17 oz + 3 lb	5	99	99	99	98	94	94	97	99	99	57
Roundup WeatherMax + Harmony GT + AMS	22 oz+ 0.33 oz + 3 lb	5	99	99	99	98	98	99	98	99	99	55
Roundup WeatherMax + Classic + AMS	22 oz+ 0.33 oz + 3 lb	5	99	99	99	96	97	97	98	99	99	57
Roundup WeatherMax + Harmony GT + Classic + AMS	22 oz + 0.33 oz + 0.33 oz + 3 lb	5	99	99	99	96	96	98	99	99	99	59
Roundup WeatherMax + Harmony GT + Classic + AMS	22 oz + 0.035 oz + 0.33 oz + 3 lb	5	99	99	98	98	93	96	97	99	98	59
Harmony GT + Classic + Select + AMS + COC	0.33 oz + 0.33 oz + 8 oz + 3 lb + 1%	5	70	80	90	70	74	91	70	97	99	60
Extreme + Harmony GT + NIS + AMS	3 pt + 0.33 oz + 0.25% + 3 lb	34	99	99	99	97	97	98	98	98	99	56
Extreme + Classic + NIS + AMS	3 pt + 0.33 oz + 0.25% + 3 lb	25	99	99	99	96	86	94	99	99	99	58
Extreme + NIS + AMS	3 pt + 0.25% + 3 lb	16	98	99	99	93	86	93	98	99	99	58
Untreated Check		0	0	0	0	0	0	0	0	0	0	30
LSD (P = 0.10)		1	1	2	2	2	3	3	2	1	1	6

a. AMS = spray grade ammonium sulfate; COC = crop oil concentrate, Helena; NIS = AGRI-DEX non-ionic surfactant, Helena.
b. Yield at 13% moisture.

Evaluation of Syngenta A14972A in soybean at Potsdam, MN in 2005.

Behnken, Lisa M., Fritz R. Breitenbach, Kristal L. Schaufler, and Corey W. Stever

The objective of this trial was to evaluate Syngenta A14972A for weed control in soybean in southeastern Minnesota. The research site was a Port Byron silt loam containing 3.2% organic matter with a pH of 6.7 and soil test P and K levels of 65 ppm and 410 ppm, respectively. The previous crop was corn. The field was field cultivated twice prior to planting. The soybean variety, Garst 1827RR/STS, was planted on May 24, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. A randomized complete block design with four replications was used. Preemergence (PRE) and postemergence (POST I, II and 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 20, July 8, July 14, July 29 and September 30, 2005. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	May 24	June 27	July 1	July 18
Treatment	PRE	POST I	POST II	POST III
Temperature (F)				
air	70	77	68	78
soil	63	71	80	NA
Relative humidity (%)	43	73	58	60
Wind (mph)	0	18	9	8
Soybean				
stage	--	V4	V5	R2
height (inch)	--	9.2	10	24
Common lambsquarters				
weed density (ft^2)	--	5.1	5.1	5.1
height (inch)	--	2.0	2.5	3.7
Wild proso millet				
weed density (ft^2)	--	10.1	10.1	10.1
height (inch)	--	8.9	8.0	5.0
Velvetleaf				
weed density (ft^2)	--	0.6	0.6	0.6
height (inch)	--	4.8	6.8	2.5
Rainfall after application (inch)				
week 1	0.31	0.16	0.07	4.82
week 2	1.82	0	0	0
week 3	0.54	0.2	0.2	0

CONCLUSIONS

No crop response was detected during the trial. Preemergence applications of A14972A at 0.5, 0.75, and 1.0 qt/A provided the same level of velvetleaf and common lambsquarters control. However, velvetleaf and common lambsquarters control with A14972A was significantly lower than the Boundary treatments.

A rate response was apparent for wild proso millet, with control increasing as the A14972A rate increased, 75% control for 0.5 qt/A compared to 88% and 92% control for 0.75 and 1.0 qt/A, respectively. Similar levels of wild proso millet control were achieved with the two higher rates of A14972A and the Boundary treatments. Sequential applications of glyphosate provided excellent control for all weed species evaluated in the trial. Early season weed control differences did not result in differences in soybean yield. (University of Minnesota Extension Service, Regional Center, Rochester, MN)

Table. Evaluation of Syngenta A14972A for weed control in soybean on June 20, July 8, and July 29 at Potsdam, MN in 2005.

Treatment[a]	Rate	Injury	Velvetleaf control			Common lambsquarters control			Wild proso millet control			Soybean yield[b]
		7/8	6/20	7/8	7/29	6/20	7/8	7/29	6/20	7/8	7/29	
	(rate/A)	(%)	(%)			(%)			(%)			(bu/A)
PRE/ POST II												
A14972A / Touchdown Total + AMS	0.5 qt / 24 oz + 3 lb	0	45	98	99	79	97	99	75	99	94	52
A14972A / Touchdown Total + AMS	0.75 qt / 24 oz + 3 lb	0	45	97	99	78	99	99	88	99	98	56
A14972A / Touchdown Total + AMS	1 qt / 24 oz + 3 lb	0	49	97	99	80	99	99	92	99	99	49
Boundary/Touchdown Total + AMS	1.25 pt / 24 oz + 3 lb	0	62	99	99	69	99	98	66	99	97	55
Boundary/Touchdown Total + AMS	1.5 pt / 24 oz + 3 lb	0	87	99	99	96	99	98	93	99	99	51
POST I												
Roundup WeatherMax + AMS	22 oz + 3 lb	0	0	99	99	0	95	96	0	96	97	56
POST I / POST II												
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 lb / 22 oz + 3 lb	0	0	99	98	0	97	95	0	97	94	53
Untreated Check		0	0	0	0	0	0	0	0	0	0	25
LSD (P=0.10)		0	5	2	1	3	2	2	8	2	3	8

a. AMS = spray grade ammonium sulfate.
b. Yield at 13% moisture.

Evaluation of V-10137 and Select tank mixed with Harmony GT for the control of wild proso millet, common lambsquarters and velvetleaf in soybean at Potsdam, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Matthew M. White, and Krista M. Sheehan

The objective of this trial was to evaluate V-10137 and Select in combination with Harmony GT for wild proso millet, common lambsquarters, and velvetleaf control in soybean in southeastern Minnesota. The research site was a Port Byron silt loam containing 3.2% organic matter with a pH of 6.7 and soil test P and K levels of 66 ppm and 376 ppm, respectively. The previous crop was corn. The field was chisel plowed in the fall, and disked and field cultivated once prior to planting in the spring. The soybean variety, Garst 1827-RR/STS, was planted on May 24, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. A randomized complete block design with four replications was used. 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 July 1, July 8, July 14, and July 29. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	June 20	June 27	July 1
Treatment	POST I	POST II	POST III
Temperature (F)			
Air	85	79	66
Soil	70	79	80
Relative humidity (%)	47	71	60
Wind (mph)	17	15	12
Soybean			
Stage	V1-V2	V5	V5
height (inch)	4.8	8.5	10.3
Wild proso millet			
weed density (ft^2)	10.8	10.8	10.8
height (inch)	4.3	6.3	10.0
Common lambsquarters			
weed density (ft^2)	6.1	6.1	6.1
height (inch)	0.9	2.2	2.3
Velvetleaf			
weed density (ft^2)	15.	1.5	1.5
height (inch)	2.3	3.1	6.8
Rainfall after application (inch)			
week 1	1.29	0.16	0.07
week 2	0.16	0.0	0.0
week 3	0.0	0.2	1.54

CONCLUSIONS

Injury in the form of stunting was sporadic in the trial. No differences in injury or weed control were observed when comparing NIS and COC as spray additives with either V-10137 or Select. POST II tank mix applications of V-10137 or Select plus Harmony GT provided better grass control than POST I / POST III sequential applications, July 14 rating.

POST I applications of Harmony GT + NIS + AMS provided superior common lambsquarters control than POST II applications on the July 8 rating date. However, these differences were not evident by the July 29 rating date.

POST II applications of Harmony GT tank mixed with V-10137 or Select provided better velvetleaf control than sequential POST I / POST III applications of Harmony GT followed by V-10137 on the July 14 and July 29 rating dates. (University of Minnesota Extension Service, Regional Center, Rochester, MN)

Table. Performance of V-10137 and Select tank mixed with Harmony GT control of wild proso millet, common lambsquarters, and velvetleaf on July 1, July 8, July 14, and July 29 at Potsdam, MN in 2005.

Treatment[a]	Rate	Injury / stunting		Wild proso millet control			Common lambsquarters control			Velvetleaf control		
		7/1	7/8	7/8	7/14	7/29	7/8	7/14	7/29	7/8	7/14	7/29
	(rate/A)	(%)		(%)			(%)			(%)		
POST I / POST III												
Harmony GT + NIS + AMS / V-10137 + NIS + AMS	0.042 oz + 0.25 % + 2 lb / 12 oz + 0.25 % + 2 lb	0	0	75	73	83	91	77	0	85	70	67
Harmony GT + COC + AMS / V-10137 + COC + AMS	0.042 oz + 0.5 % + 2 lb / 12 oz + 0.5 % + 2 lb	0	0	79	75	82	87	80	83	83	70	74
POST II												
V-10137 + Harmony GT + NIS + AMS	12 oz + 0.042 oz + 0.25 % + 2 lb	1	0	84	86	90	83	86	90	89	92	91
V-10137 + Harmony GT + COC + AMS	12 oz + 0.042 oz + 0.5 % + 2 lb	0	0	83	86	88	81	87	89	87	90	89
Select + Harmony GT + COC + AMS	6 oz + 0.042 oz + 0.5 % + 2 lb	1	0	83	90	94	82	84	88	91	95	94
V-10137 + Harmony GT + NIS + AMS	9 oz + 0.042 oz + 0.25 % + 2 lb	1	0	84	84	89	86	80	85	87	86	83
V-10137 + Harmony GT + COC + AMS	9 oz + 0.042 oz + 0.5 % + 2 lb	0	0	83	86	95	82	78	88	89	92	93
Untreated check		0	0	0	0	0	0	0	0	0	0	0
LSD (P=0.10)		2	0	5	8	9	6	5	7	6	9	10

a. NIS = Agri-Dex nonionic surfactant, Helena; AMS = spray grade ammonium sulfate, Helena; COC = Agri-Dex crop oil concentrate, Helena.

Evaluation of weed management systems in soybean at Potsdam, MN in 2005.

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The objective of this trial was to evaluate weed management systems for weed control in soybean in southeastern Minnesota. The research site was a Port Byron Silt Loam containing 3.2% organic matter with a pH test of 6.6 and soil test P and K levels of 67 ppm and 342 ppm, respectively. The previous crop was corn. The field was field cultivated twice prior to planting. The soybean variety, Garst 1827RR/STS, was planted on May 24, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. A randomized complete block design with four replications was used. Pre-plant incorporated (PPI), 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 20, July 8, July 14, and July 29. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	May 24	May 24	June 20	June 27	July 1	July 19
Treatment	PPI	PRE	POST I	POST II	POST III	POST IV
Temperature (F)						
air	69	70	87	77	69	78
soil	59	59	70	72	80	--
Relative humidity (%)	56	43	44	73	54	60
Wind (mph)	6	8	15	18	14	8
Soil moisture	adequate	adequate	adequate	adequate	dry	adequate
Soybean						
stage	seeded	seeded	V2	V5	V5	R2
height (inch)	0	0	6.1	8.9	10.0	24.0
Wild proso millet						
weed density (ft^2)	--	--	11.8	11.8	11.8	11.8
height (inch)	--	--	3.5	7.1	10.5	5.0
Common lambsquarters						
weed density (ft^2)	--	--	2.4	2.4	2.4	2.4
height (inch)	--	--	2.0	1.7	3.0	3.7
Velvetleaf						
weed density(ft^2)	--	--	0.6	0.6	0.6	0.6
height (inch)	--	--	2.5	3.8	8.8	2.5
Rainfall after application (inch)						
week 1	0.31	0.31	1.29	0.16	0.07	4.82
week 2	0.11	0.11	0.16	0.0	0.0	0.0
week 3	2.15	2.15	0.0	0.2	1.54	0.0

CONCLUSIONS

Soybean injury from 22 to 39% was observed in the PRE/POST II treatments. Soybean yields for Gangster V + Gangster FR / FirstRate + Phoenix + V10137 +NIS+N-PAK AMS and Boundary / Flexstar + Fusion + FirstRate + MSO + 28%N were lower than the top yielding treatments of Prowl H_20 + Outlook / Roundup WeatherMax + N-PAK AMS and Valor SX + Sencor / Roundup Original Max + N-PAK AMS. Soybean yields for the other PRE/POST II treatments trended lower. Injury was also observed in the PPI/POST II treatments of Prowl H_20 / Raptor + FirstRate + NIS + N-PAK AMS and the Prowl H_20 / Extreme + NIS + N-PAK AMS treatments, 32 and 24% on July 1, respectively. However, the injury dropped to 11% for both treatments by the July 8 rating date.

Sequence + N-PAK AMS applied as a solo treatment at POST I resulted in significantly lower wild proso millet, common lambsquarters, and velvetleaf control compared to all other treatments and had a reduced soybean yield compared to the top treatments. Wild proso millet control with Pursuit Plus / FirstRate + NIS + N-PAK AMS applied PPI/POST II was significantly lower than all other treatments except the Sequence + N-PAK AMS treatment. Several PPI and PRE treatments gave reduced velvetleaf control, 50 to 70% on the June 20 rating. However, control reached 97 to 99% on all treatments after POST applications were applied. (University of Minnesota Extension Service, Regional Center, Rochester).

Table. Performance of soybean weed management systems for weed control in soybeans on June 20, July 8, July 14, and July 29 at Potsdam, MN in 2005.

Treatment[a]	Rate	Injury		Wild proso millet control				Common lambsquarters control				Velvetleaf control				Soybean yield[b]
		7/1	7/8	6/20	7/8	7/14	7/29	6/20	7/8	7/14	7/29	6/20	7/8	7/14	7/29	
	(rate/A)	(%)		(%)				(%)				(%)				(bu/A)
PPI / POST II																
Prowl H_20 / Raptor + FirstRate + NIS + N-PAK AMS	43 oz / 4 oz + 0.3 oz + 0.25% + 3 qt	32	11	87	98	97	96	96	97	98	98	50	99	99	99	55
Pursuit Plus / FirstRate + NIS + N-PAK AMS	2.5 pt / 0.3 oz + 0.25% + 3 qt	5	3	90	86	85	72	99	99	99	98	95	99	99	99	53
Prowl H_20 / Extreme + NIS + N-PAK AMS	43 oz / 3 pt + 0.125% + 3 qt	24	11	84	97	96	95	99	99	97	99	60	99	99	99	53
PRE / POST II																
Gangster V + Gangster FR / FirstRate + Phoenix + V10137 +NIS+N-PAK AMS	2.5 oz + 0.5 oz / 0.3 oz + 8 oz + 12 oz + 0.25% + 3 qt	39	28	92	98	96	96	99	99	99	99	99	99	99	99	51
Gangster V + Gangster FR / FirstRate + Phoenix + V10139 + NIS+N-PAK AMS	2.5 oz + 0.5 oz / 0.3 oz + 8 oz + 8 oz + 0.25% + 3 qt	32	28	88	97	95	93	99	98	98	96	99	99	99	99	52
Python / FirstRate + Select + Cobra + COC + N-PAK AMS	1 oz / 0.3 oz + 6 oz + 6 oz + 1% + 3 qt	37	26	72	95	95	93	98	99	99	99	96	99	99	99	52
Boundary / Flexstar + Fusion + FirstRate + MSO + 28%N	1.5 pt / 16 oz + 8 oz + 0.3 oz + 1% + 2.5%	36	22	94	99	94	94	98	99	98	98	70	99	99	99	52
PRE / POST III																
IntRRo / Roundup WeatherMax + N-PAK AMS	2 qt / 22 oz + 3 qt	1	0	91	96	97	97	98	99	99	99	40	99	99	99	53
Prowl H_20 + Outlook / Roundup WeatherMax + N-PAK AMS	1 pt + 12.6 oz + 22 oz + 3 qt	3	1	93	96	98	97	99	99	98	99	63	98	98	99	58
Gangster V + Gangster FR / Roundup Original Max + N-PAK AMS	1.5 oz + 0.3 oz / 22 oz + 4 qt	0	0	85	94	97	96	99	99	99	99	94	99	99	99	56
Boundary / Touchdown Total + N-PAK AMS	1.25 pt / 24 oz + 2 qt	4	0	91	97	98	96	96	99	99	99	60	99	99	99	56
Valor / Roundup Original Max + N-PAK AMS	2 oz / 22 oz + 4 qt	0	0	91	97	98	98	99	99	99	99	87	99	99	99	56

Treatment[a]	Rate	Injury		Wild proso millet control				Common lambsquarters control				Velvetleaf control				Soybean yield[b]
		7/1	7/8	6/20	7/8	7/14	7/29	6/20	7/8	7/14	7/29	6/20	7/8	7/14	7/29	
	(rate/A)	(%)		(%)				(%)				(%)				(bu/A)
Valor SX + Python / Roundup Original Max + N-PAK AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	0	1	78	93	95	94	97	99	99	99	91	99	99	97	53
Valor SX + Sencor / Roundup Original Max + N-PAK AMS	1.5 oz + 3 oz / 22 oz + 3 qt	0	0	81	94	95	96	99	99	99	99	90	99	99	99	58
POST I																
Sequence + N-PAK AMS	2.5 pt + 2 qt	0	1	0	78	75	33	0	79	74	65	0	89	82	73	49
POST II / POST IV																
Roundup WeatherMax + N-PAK AMS / Roundup WeatherMax + N-PAK AMS	22 oz + 3 qt / 22 oz + 3 qt	0	0	0	88	87	98	0	98	96	99	0	99	99	99	53
POST III																
Glyphomax XRT + FirstRate + N-PAK AMS	24 oz + 0.3 oz + 3 qt	0	3	0	79	87	96	0	98	95	96	0	99	98	99	54
Harmony GT + Roundup Original Max +N-PAK AMS	0.33 oz + 22 oz + 2.35 qt	0	1	0	80	87	94	0	97	95	95	0	99	99	99	53
Harmony GT + Classic + Roundup Original Max + N-PAK AMS	0.33 oz + 0.33 oz + 22 oz + 2.35 qt	0	1	0	87	86	94	0	97	97	96	0	98	99	99	55
Clearout 41Plus + N-PAK AMS	32 oz + 3 qt	0	1	0	82	87	95	0	97	95	96	0	99	99	99	54
Glyphomax XRT + N-PAK AMS	24 oz + 3 qt	0	0	0	81	86	95	0	96	97	95	0	99	99	98	55
Roundup WeatherMax + N-PAK AMS	22 oz + 3 qt	0	1	0	80	88	95	0	97	98	97	0	98	99	99	49
Weedy Check		0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
Weed Free		0	0	100	100	100	100	100	100	100	100	100	100	100	100	54
LSD (P=0.10)		3	3	7	7	8	8	2	2	3	3	9	2	1	2	7

a. NIS = AGRI-DEX nonionic surfactant, Helena; N-PAK AMS = ammonium sulfate solution, Agriliance LLC; COC = crop oil concentrate, Helena; MSO = DyneAmic methylated seed oil, Helena; 28% UAN = an aqueous solution of urea and ammonium nitrate.

b. Yield adjusted to 13% moisture.

2005 Soybean Herbicide Evaluation
Combined across locations

	Herbicide	Rate	Giant Foxtail	Yellow foxtail	Wild Proso millet	Giant ragweed	Common ragweed	Common cocklebur	Velvetleaf	Common lambsquarters	Redroot pigweed	Tall waterhemp	Yield	Cost	Returns
			Number of Locations												
		(product/A)	4	1	1	1	2	1	3	6	3	1	6		6
	Preplant incorporated/ POST I (4-inch weeds)						----------(% control)----------						(bu/A)	----($/A)-----	
1	Prowl H2O / Raptor + First Rate + NIS + AMS	43 oz / 4 oz + 0.3 oz + 0.25% + 3 qt	98	95	96	99	91	77	99	97	96	15	43.3	50.00	163
2	Pursuit Plus / First Rate + NIS + AMS	2.5 / 0.3 + 0.25% + 3 qt	84	89	72	99	93	80	99	96	97	17	43.3	38.95	174
3	Prowl H2O / Extreme + NIS + AMS	43 oz / 3 pt + 0.125% + 3 qt	96	95	95	99	89	62	97	96	99	87	46.0	50.46	176
	Preemergence/ POST I (4-inch weeds)														
4	Weedy	-	0	0	0	0	0	0	0	0	0	0	12.9	0.00	64
5	Gangster / First Rate + Phoenix + SelectMax + NIS + AMS	3 oz / 0.3 oz + 8 oz + 12 oz + 0.25% + 3 qt	81	91	96	97	98	82	98	70	99	99	40.4	59.86	139
6	Gangster / First Rate + Phoenix + V10139 + NIS + AMS	3 oz / 0.3 oz + 8 oz + 8 oz + 0.25% + 3 qt	82	90	93	96	97	78	99	67	99	89	42.1	no label	na
7	Python / First Rate + Select + Cobra + COC + AMS	1 oz / 0.3 oz + 6 oz + 6 oz + 1% + 3 qt	81	81	93	93	96	91	98	75	98	79	40.2	47.17	150
8	Boundary / Flexstar + Fusion + First Rate + MSO + 28%	1.5 / 16 oz + 8 oz + 0.3 oz + 1% + 2.5%	85	96	94	90	99	78	98	81	98	82	44.4	59.19	159
	Preemergence/ POST II (6-inch weeds)														
9	IntRRo / RoundupWeatherMax + AMS	4 / 22 oz + 3 qt	97	92	97	94	83	53	95	90	93	88	47.8	46.51	188
10	Prowl H2O + Outlook / Roundup WeatherMax	1 + 12.6 oz / 22 oz + 3 qt	98	94	97	92	78	58	91	93	97	88	51.1	54.13	197
11	Gangster/ Roundup OriginalMax + AMS	1.8 oz / 22 oz + 4 qt	93	90	96	91	94	69	98	99	94	85	49.6	42.76	201
12	Boundary / Touchdown Total + AMS	1.25 / 24 oz + 2 qt	98	96	97	89	83	51	79	94	93	90	48.7	43.05	196
13	Valor SX / Roundup OriginalMax + AMS	2 oz / 22 oz + 4 qt	93	93	98	90	89	51	98	95	99	92	48.6	40.71	198
14	Valor SX + Python / Roundup OriginalMax + AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	92	92	94	97	95	68	98	99	99	96	49.2	42.59	199
15	Valor SX + Sencor / Roundup OriginalMax + AMS	1.5 oz + 3 oz / 22 oz + 3 qt	93	91	96	95	89	60	97	97	97	92	51.6	41.87	212
	POST II (6-inch weeds)														
16	Weed Free	-	100	100	100	100	100	100	100	100	100	100	50.7	0.00	249
17	Sequence + AMS	2.5 pt + 2 qt	97	94	33	90	85	73	84	82	83	90	49.0	36.56	204
	POST I (4-inch weeds)/POST III(Canopy)														
18	Roundup WeatherMax + AMS / Roundup Weather Max + AMS	22 oz + 3 qt / 22 oz + 3 qt	99	97	98	99	98	96	99	97	98	94	51.7	49.04	205
	POST II (6-inch weeds)														
19	Glyphomax XRT + First Rate + AMS	24 oz + 0.3 oz + 3 qt	92	96	96	99	91	70	98	96	88	80	49.7	35.39	209
20	Harmony GT + Roundup OriginalMax + AMS	0.33 oz + 22 oz + 4.7	88	97	94	92	83	73	97	94	92	78	47.9	30.17	206
21	Harmony GT + Classic + Roundup OriginalMax + AMS	0.33 oz + 0.33 oz + 22 oz + 4.7	93	95	94	92	92	83	97	95	98	72	50.9	34.41	216
22	Clearout 41 Plus + AMS	32 oz + 3 qt	89	95	95	87	83	71	88	89	74	78	48.1	24.88	212
23	Glyphomax XRT + AMS	24 oz + 3 qt	92	93	95	91	83	70	96	89	79	77	49.6	27.96	216
24	Roundup WeatherMax+AMS	22 oz + 3 qt	89	94	95	94	88	63	96	92	80	80	48.1	31.39	205
		LSD(0.10)	3	4	8	7	6	19	6	6	6	14	2.5		12

2005 Soybean Herbicide Evaluation - Potsdam

	Herbicide	Rate	Wild Proso millet	Common lambsquarters	Velvetleaf	Yield	Cost	Returns
	Preplant incorporated/ POST I (4-inch weeds)	(pt/A)	----------(% control)----------			(bu/A)	----($/A)-----	
1	Prowl H2O / Raptor + First Rate + NIS + AMS	43 oz / 4 oz + 0.3 oz + 0.25% + 3 q	96	98	99	55.2	50.00	221
2	Pursuit Plus / First Rate + NIS + AMS	2.5 / 0.3 + 0.25% + 3 qt	72	98	99	52.9	38.95	221
3	Prowl H2O / Extreme + NIS + AMS	43 oz / 3 pt + 0.125% + 3 q	95	99	99	52.6	50.46	208
	Preemergence/ POST I (4-inch weeds)							
4	Weedy	-	0	0	0	40.7	0.00	200
5	Gangster / First Rate + Phoenix + SelectMax + NIS + AMS	3 oz / 0.3 oz + 8 oz + 12 oz + 0.25% + 3 c	96	99	99	50.7	59.86	190
6	Gangster / First Rate + Phoenix + V10139 + NIS + AMS	3 oz / 0.3 oz + 8 oz + 8 oz + 0.25% + 3 c	93	96	99	52.2	no labe	na
7	Python / First Rate + Select + Cobra + COC + AMS	1 oz / 0.3 oz + 6 oz + 6 oz + 1% + 3 q	93	99	99	52.0	47.17	209
8	Boundary / Flexstar + Fusion + First Rate + MSO + 28%	1.5 / 16 oz + 8 oz + 0.3 oz + 1% + 2.5%	94	98	99	51.5	59.19	194
	Preemergence/ POST II (6-inch weeds							
9	IntRRo / RoundupWeatherMax + AMS	4 / 22 oz + 3 qt	97	99	99	51.7	46.51	208
10	Prowl H2O + Outlook / Roundup WeatherMa	1 + 12.6 oz / 22 oz + 3 q	97	99	99	57.7	54.13	230
11	Gangster/ Roundup OriginalMax + AMS	1.8 oz / 22 oz + 4 qt	96	99	99	55.5	42.76	230
12	Boundary / Touchdown Total + AMS	1.25 / 24 oz + 2 qt	97	99	99	55.6	43.05	231
13	Valor SX / Roundup OriginalMax + AMS	2 oz / 22 oz + 4 qt	98	99	99	55.5	40.71	232
14	Valor SX + Python / Roundup OriginalMax + AMS	1.5 oz + 0.5 oz / 22 oz + 3 q	94	99	97	53.0	42.59	218
15	Valor SX + Sencor / Roundup OriginalMax + AMS	1.5 oz + 3 oz / 22 oz + 3 q	96	99	99	58.3	41.87	245
	POST II (6-inch weeds)							
16	Weed Free	-	100	100	100	53.8	0.00	265
17	Sequence + AMS	2.5 pt + 2 qt	33	65	73	49.0	36.56	205
	POST I (4-inch weeds)/POST III(Canopy							
18	Roundup WeatherMax + AMS	22 oz + 3 qt /	98	99	99	53.1	49.04	212
	Roundup Weather Max + AMS	22 oz + 3 qt						
	POST II (6-inch weeds)							
19	Glyphomax XRT + First Rate + AMS	24 oz + 0.3 oz + 3 qt	96	96	99	54.0	35.39	230
20	Harmony GT + Roundup OriginalMax + AMS	0.33 oz + 22 oz + 4.7	94	95	99	53.0	30.17	231
21	Harmony GT + Classic + Roundup OriginalMax + AMS	0.33 oz + 0.33 oz + 22 oz + 4.7	94	96	99	55.0	34.41	236
22	Clearout 41 Plus + AMS	32 oz + 3 qt	95	96	99	53.9	24.88	240
23	Glyphomax XRT + AMS	24 oz + 3 qt	95	95	98	55.4	27.96	245
24	Roundup WeatherMax+AMS	22 oz + 3 qt	95	97	99	49.0	31.39	210
		LSD(0.10)	8	3	2	6.6		33

2005 Soybean Herbicide Evaluation - Waseca
Common cocklebur site

	Herbicide	Rate	Giant foxtail	Common cocklebur	Common ragweed	Common lambsquarters	Redrrot pigweed	Yield	Cost	Returns
	Preplant incorporated/ POST I (4-inch weeds)	(pt/A)			----------(% control)----------			(bu/A)	----($/A)-----	
1	Prowl H2O / Raptor + First Rate + NIS + AMS	43 oz / 4 oz + 0.3 oz + 0.25% + 3 q	98	77	83	93	94	42.9	50.00	161
2	Pursuit Plus / First Rate + NIS + AMS	2.5 / 0.3 + 0.25% + 3 qt	72	80	88	94	99	37.5	38.95	146
3	Prowl H2O / Extreme + NIS + AMS	43 oz / 3 pt + 0.125% + 3 q	98	62	78	99	99	39.9	50.46	146
	Preemergence/ POST I (4-inch weeds)									
4	Weedy	-	0	0	0	0	0	0.6	0.00	3
5	Gangster / First Rate + Phoenix + SelectMax + NIS + AMS	3 oz / 0.3 oz + 8 oz + 12 oz + 0.25% + 3 c	56	82	97	61	99	22.0	59.86	48
6	Gangster / First Rate + Phoenix + V10139 + NIS + AMS	3 oz / 0.3 oz + 8 oz + 8 oz + 0.25% + 3 c	57	78	95	34	99	24.1	no labe	na
7	Python / First Rate + Select + Cobra + COC + AMS	1 oz / 0.3 oz + 6 oz + 6 oz + 1% + 3 q	54	91	92	58	99	15.6	47.17	29
8	Boundary / Flexstar + Fusion + First Rate + MSO + 28%	1.5 / 16 oz + 8 oz + 0.3 oz + 1% + 2.5%	65	78	99	63	99	26.6	59.19	72
	Preemergence/ POST II (6-inch weeds									
9	IntRRo / RoundupWeatherMax + AMS	4 / 22 oz + 3 qt	94	53	70	91	81	33.0	46.51	116
10	Prowl H2O + Outlook / Roundup WeatherMa	1 + 12.6 oz / 22 oz + 3 q	96	58	60	96	97	37.9	54.13	132
11	Gangster/ Roundup OriginalMax + AMS	1.8 oz / 22 oz + 4 q	76	69	89	99	85	35.6	42.76	132
12	Boundary / Touchdown Total + AMS	1.25 / 24 oz + 2 qt	96	51	67	99	87	34.6	43.05	127
13	Valor SX / Roundup OriginalMax + AMS	2 oz / 22 oz + 4 q	88	51	79	88	99	29.8	40.71	106
14	Valor SX + Python / Roundup OriginalMax + AM	1.5 oz + 0.5 oz / 22 oz + 3 q	80	68	90	99	99	33.9	42.59	124
15	Valor SX + Sencor / Roundup OriginalMax + AM	1.5 oz + 3 oz / 22 oz + 3 q	82	60	80	99	93	35.3	41.87	132
	POST II (6-inch weeds)									
16	Weed Free	-	98	97	97	100	94	41.3	0.00	203
17	Sequence + AMS	2.5 pt + 2 qt	93	73	72	69	51	33.7	36.56	129
	POST I (4-inch weeds)/POST III(Canopy									
18	Roundup WeatherMax + AMS	22 oz + 3 qt /	97	96	99	99	99	41.4	49.04	154
	Roundup Weather Max + AMS	22 oz + 3 qt								
	POST II (6-inch weeds)									
19	Glyphomax XRT + First Rate + AMS	24 oz + 0.3 oz + 3 qt	76	70	82	86	69	34.8	35.39	136
20	Harmony GT + Roundup OriginalMax + AMS	0.33 oz + 22 oz + 4.7	70	73	66	91	80	28.9	30.17	112
21	Harmony GT + Classic + Roundup OriginalMax + AMS	0.33 oz + 0.33 oz + 22 oz + 4.7	80	83	88	92	97	40.5	34.41	165
22	Clearout 41 Plus + AMS	32 oz + 3 qt	73	71	70	72	26	26.1	24.88	103
23	Glyphomax XRT + AMS	24 oz + 3 qt	80	70	72	79	43	33.5	27.96	137
24	Roundup WeatherMax+AMS	22 oz + 3 qt	70	63	78	82	52	35.0	31.39	141
		LSD(0.10)	12	19	12	18	18	7.6		37

2005 Soybean Herbicide Evaluation - Waseca
Common ragweed site

	Herbicide	Rate	Giant foxtail	Common ragweed	Common lambsquarters	Redroot Pigweed	Yield	Cost	Returns
	Preplant incorporated/ POST I (4-inch weeds)	(pt/A)		----------(% control)----------			(bu/A)	----($/A)-----	
1	Prowl H2O / Raptor + First Rate + NIS + AMS	43 oz / 4 oz + 0.3 oz + 0.25% + 3 q	99	99	99	99	49.4	50.00	193
2	Pursuit Plus / First Rate + NIS + AMS	2.5 / 0.3 + 0.25% + 3 q	89	99	99	98	48.6	38.95	200
3	Prowl H2O / Extreme + NIS + AMS	43 oz / 3 pt + 0.125% + 3 q	89	99	87	99	45.9	50.46	175
	Preemergence/ POST I (4-inch weeds)								
4	Weedy	-	0	0	0	0	11.2	0.00	55
5	Gangster / First Rate + Phoenix + SelectMax + NIS + AMS	3 oz / 0.3 oz + 8 oz + 12 oz + 0.25% + 3 c	93	99	86	99	53.4	59.86	203
6	Gangster / First Rate + Phoenix + V10139 + NIS + AMS	3 oz / 0.3 oz + 8 oz + 8 oz + 0.25% + 3 c	93	99	81	99	50.5	no labe	na
7	Python / First Rate + Select + Cobra + COC + AMS	1 oz / 0.3 oz + 6 oz + 6 oz + 1% + 3 c	91	99	95	99	52.4	47.17	211
8	Boundary / Flexstar + Fusion + First Rate + MSO + 28%	1.5 / 16 oz + 8 oz + 0.3 oz + 1% + 2.5%	95	99	99	99	54.5	59.19	209
	Preemergence/ POST II (6-inch weeds								
9	IntRRo / RoundupWeatherMax + AMS	4 / 22 oz + 3 qt	99	96	99	99	56.1	46.51	229
10	Prowl H2O + Outlook / Roundup WeatherMa	1 + 12.6 oz / 22 oz + 3 q	98	95	99	97	56.3	54.13	223
11	Gangster/ Roundup OriginalMax + AMS	1.8 oz / 22 oz + 4 q	99	99	99	99	55.4	42.76	230
12	Boundary / Touchdown Total + AMS	1.25 / 24 oz + 2 qt	99	98	99	96	55.5	43.05	230
13	Valor SX / Roundup OriginalMax + AMS	2 oz / 22 oz + 4 q	96	99	99	99	54.7	40.71	228
14	Valor SX + Python / Roundup OriginalMax + AM	1.5 oz + 0.5 oz / 22 oz + 3 q	99	99	99	99	56.1	42.59	233
15	Valor SX + Sencor / Roundup OriginalMax + AM	1.5 oz + 3 oz / 22 oz + 3 q	99	99	99	99	56.3	41.87	235
	POST II (6-inch weeds)								
16	Weed Free	-	99	99	99	99	55.0	0.00	271
17	Sequence + AMS	2.5 pt + 2 qt	97	98	99	99	56.9	36.56	244
	POST I (4-inch weeds)/POST III(Canopy)								
18	Roundup WeatherMax + AMS	22 oz + 3 qt /	99	97	99	97	58.9	49.04	241
	Roundup Weather Max + AMS	22 oz + 3 qt							
	POST II (6-inch weeds)								
19	Glyphomax XRT + First Rate + AMS	24 oz + 0.3 oz + 3 q	99	99	99	98	56.9	35.39	245
20	Harmony GT + Roundup OriginalMax + AMS	0.33 oz + 22 oz + 4.7	96	99	99	99	59.1	30.17	260
21	Harmony GT + Classic + Roundup OriginalMax + AMS	0.33 oz + 0.33 oz + 22 oz + 4.7	98	96	99	99	56.0	34.41	241
22	Clearout 41 Plus + AMS	32 oz + 3 qt	96	97	99	98	56.9	24.88	255
23	Glyphomax XRT + AMS	24 oz + 3 qt	96	93	99	99	57.4	27.96	254
24	Roundup WeatherMax+AMS	22 oz + 3 qt	97	99	99	92	54.9	31.39	238
		LSD(0.10)	4	4	9	3	4.1		20

2005 Soybean Herbicide Evaluation - Waseca
Giant ragweed site

	Herbicide	Rate	Giant foxtail	Giant ragweed	Common lambsquarters	Velvetleaf	Yield	Cost	Returns
	Preplant incorporated/ POST I (4-inch weeds)	(pt/A)		----------(% control)----------			(bu/A)	----($/A)-----	
1	Prowl H2O / Raptor + First Rate + NIS + AMS	43 oz / 4 oz + 0.3 oz + 0.25% + 3 q	97	99	99	99	40.6	50.00	150
2	Pursuit Plus / First Rate + NIS + AMS	2.5 / 0.3 + 0.25% + 3 qt	85	99	86	99	44.9	38.95	182
3	Prowl H2O / Extreme + NIS + AMS	43 oz / 3 pt + 0.125% + 3 qt	99	99	99	96	42.5	50.46	158
	Preemergence/ POST I (4-inch weeds)								
4	Weedy	-	0	0	0	0	2.1	0.00	10
5	Gangster / First Rate + Phoenix + SelectMax + NIS + AMS	3 oz / 0.3 oz + 8 oz + 12 oz + 0.25% + 3 c	82	97	59	96	34.3	59.86	109
6	Gangster / First Rate + Phoenix + V10139 + NIS + AMS	3 oz / 0.3 oz + 8 oz + 8 oz + 0.25% + 3 c	81	96	56	99	39.0	no labe	na
7	Python / First Rate + Select + Cobra + COC + AMS	1 oz / 0.3 oz + 6 oz + 6 oz + 1% + 3 c	83	93	47	96	37.1	47.17	135
8	Boundary / Flexstar + Fusion + First Rate + MSO + 28%	1.5 / 16 oz + 8 oz + 0.3 oz + 1% + 2.5%	89	90	75	96	41.9	59.19	147
	Preemergence/ POST II (6-inch weeds								
9	IntRRo / RoundupWeatherMax + AMS	4 / 22 oz + 3 qt	99	94	99	88	48.8	46.51	194
10	Prowl H2O + Outlook / Roundup WeatherMa	1 + 12.6 oz / 22 oz + 3 q	98	92	97	81	53.0	54.13	207
11	Gangster/ Roundup OriginalMax + AMS	1.8 oz / 22 oz + 4 qt	97	91	99	96	52.0	42.76	213
12	Boundary / Touchdown Total + AMS	1.25 / 24 oz + 2 qt	98	89	99	69	49.9	43.05	203
13	Valor SX / Roundup OriginalMax + AMS	2 oz / 22 oz + 4 qt	92	90	99	96	46.6	40.71	189
14	Valor SX + Python / Roundup OriginalMax + AM	1.5 oz + 0.5 oz / 22 oz + 3 q	93	97	99	97	47.6	42.59	192
15	Valor SX + Sencor / Roundup OriginalMax + AMS	1.5 oz + 3 oz / 22 oz + 3 q	94	95	99	94	51.5	41.87	211
	POST II (6-inch weeds)								
16	Weed Free	-	99	96	99	99	51.3	0.00	253
17	Sequence + AMS	2.5 pt + 2 qt	98	90	91	97	47.6	36.56	197
	POST I (4-inch weeds)/POST III(Canopy)								
18	Roundup WeatherMax + AMS	22 oz + 3 qt /	99	99	99	99	52.5	49.04	209
	Roundup Weather Max + AMS	22 oz + 3 qt							
	POST II (6-inch weeds)								
19	Glyphomax XRT + First Rate + AMS	24 oz + 0.3 oz + 3 qt	98	99	99	97	52.9	35.39	225
20	Harmony GT + Roundup OriginalMax + AMS	0.33 oz + 22 oz + 4.7	90	92	99	93	48.3	30.17	207
21	Harmony GT + Classic + Roundup OriginalMax + AMS	0.33 oz + 0.33 oz + 22 oz + 4.7	95	92	97	95	53.1	34.41	227
22	Clearout 41 Plus + AMS	32 oz + 3 qt	90	87	99	77	49.8	24.88	220
23	Glyphomax XRT + AMS	24 oz + 3 qt	96	91	99	95	52.2	27.96	229
24	Roundup WeatherMax+AMS	22 oz + 3 qt	94	94	99	94	51.3	31.39	221
		LSD(0.10)	4	7	19	13	5.1		25

2005 Soybean Herbicide Evaluation - Waseca
Tall waterhemp site

	Herbicide	Rate	Giant foxtail	Tall waterhemp	Common lambsquarters	Velvetleaf	Yield	Cost	Returns
	Preplant incorporated/ POST I (4-inch weeds)	(pt/A)		----------(% control)----------			(bu/A)	----($/A)-----	
1	Prowl H2O / Raptor + First Rate + NIS + AMS	43 oz / 4 oz + 0.3 oz + 0.25% + 3 q	99	15	93	99	15.2	50.00	25
2	Pursuit Plus / First Rate + NIS + AMS	2.5 / 0.3 + 0.25% + 3 qt	92	17	99	99	18.5	38.95	52
3	Prowl H2O / Extreme + NIS + AMS	43 oz / 3 pt + 0.125% + 3 q	99	87	96	96	40.0	50.46	146
	Preemergence/ POST I (4-inch weeds)								
4	Weedy	-	0	0	0	0	1.5	0.00	8
5	Gangster / First Rate + Phoenix + SelectMax + NIS + AMS	3 oz / 0.3 oz + 8 oz + 12 oz + 0.25% + 3 c	91	99	15	99	25.5	59.86	66
6	Gangster / First Rate + Phoenix + V10139 + NIS + AMS	3 oz / 0.3 oz + 8 oz + 8 oz + 0.25% + 3 c	96	89	35	99	31.4	no labe	
7	Python / First Rate + Select + Cobra + COC + AMS	1 oz / 0.3 oz + 6 oz + 6 oz + 1% + 3 q	94	79	54	99	26.4	47.17	83
8	Boundary / Flexstar + Fusion + First Rate + MSO + 28%	1.5 / 16 oz + 8 oz + 0.3 oz + 1% + 2.5%	92	82	52	99	34.3	59.19	110
	Preemergence/ POST II (6-inch weeds								
9	IntRRo / RoundupWeatherMax + AMS	4 / 22 oz + 3 qt	96	88	57	99	39.6	46.51	148
10	Prowl H2O + Outlook / Roundup WeatherMa	1 + 12.6 oz / 22 oz + 3 q	99	88	69	93	45.9	54.13	172
11	Gangster/ Roundup OriginalMax + AMS	1.8 oz / 22 oz + 4 qt	99	85	99	99	42.3	42.76	165
12	Boundary / Touchdown Total + AMS	1.25 / 24 oz + 2 qt	99	90	70	70	37.3	43.05	141
13	Valor SX / Roundup OriginalMax + AMS	2 oz / 22 oz + 4 qt	95	92	89	99	46.9	40.71	190
14	Valor SX + Python / Roundup OriginalMax + AMS	1.5 oz + 0.5 oz / 22 oz + 3 q	96	96	99	99	47.8	42.59	193
15	Valor SX + Sencor / Roundup OriginalMax + AMS	1.5 oz + 3 oz / 22 oz + 3 q	96	92	87	99	50.2	41.87	205
	POST II (6-inch weeds)								
16	Weed Free	-	99	95	91	99	46.6	0.00	230
17	Sequence + AMS	2.5 pt + 2 qt	99	90	72	82	49.1	36.56	205
	POST I (4-inch weeds)/POST III(Canopy								
18	Roundup WeatherMax + AMS	22 oz + 3 qt /	99	94	87	99	46.9	49.04	182
	Roundup Weather Max + AMS	22 oz + 3 qt							
	POST II (6-inch weeds)								
19	Glyphomax XRT + First Rate + AMS	24 oz + 0.3 oz + 3 qt	95	80	99	99	42.9	35.39	176
20	Harmony GT + Roundup OriginalMax + AMS	0.33 oz + 22 oz + 4.7	97	78	84	99	42.8	30.17	180
21	Harmony GT + Classic + Roundup OriginalMax + AMS	0.33 oz + 0.33 oz + 22 oz + 4.7	98	72	87	99	43.1	34.41	178
22	Clearout 41 Plus + AMS	32 oz + 3 qt	97	78	71	88	45.6	24.88	200
23	Glyphomax XRT + AMS	24 oz + 3 qt	98	77	67	94	42.0	27.96	179
24	Roundup WeatherMax+AMS	22 oz + 3 qt	95	80	76	96	43.6	31.39	183
		LSD(0.10)	4	14	22	11	8.2		39

2005 Soybean Herbicide Evaluation - Lamberton

	Herbicide	Rate	Yellow foxtail	Common lambsquarters	Redroot pigweed	Yield	Cost	Returns
	Preplant incorporated/ POST I (4-inch weeds)	(pt/A)	----------(% control)----------			(bu/A)	----($/A)-----	
1	Prowl H2O / Raptor + First Rate + NIS + AMS	43 oz / 4 oz + 0.3 oz + 0.25% + 3 q	95	98	96	56.9	50.00	230
2	Pursuit Plus / First Rate + NIS + AMS	2.5 / 0.3 + 0.25% + 3 qt	89	98	93	57.5	38.95	244
3	Prowl H2O / Extreme + NIS + AMS	43 oz / 3 pt + 0.125% + 3 q	95	98	98	55.4	50.46	222
	Preemergence/ POST I (4-inch weeds)							
4	Weedy	-	0	0	0	21.5	0.00	106
5	Gangster / First Rate + Phoenix + SelectMax + NIS + AMS	3 oz / 0.3 oz + 8 oz + 12 oz + 0.25% + 3 q	91	98	98	56.5	59.86	218
6	Gangster / First Rate + Phoenix + V10139 + NIS + AMS	3 oz / 0.3 oz + 8 oz + 8 oz + 0.25% + 3 q	90	98	98	55.3	no labe	
7	Python / First Rate + Select + Cobra + COC + AMS	1 oz / 0.3 oz + 6 oz + 6 oz + 1% + 3 q	81	96	97	57.5	47.17	236
8	Boundary / Flexstar + Fusion + First Rate + MSO + 28%	1.5 / 16 oz + 8 oz + 0.3 oz + 1% + 2.5%	96	98	97	57.8	59.19	225
	Preemergence/ POST II (6-inch weeds							
9	IntRRo / RoundupWeatherMax + AMS	4 / 22 oz + 3 qt	92	98	98	57.5	46.51	236
10	Prowl H2O + Outlook / Roundup WeatherMa	1 + 12.6 oz / 22 oz + 3 q	94	98	98	55.7	54.13	220
11	Gangster/ Roundup OriginalMax + AMS	1.8 oz / 22 oz + 4 qt	90	98	98	56.8	42.76	237
12	Boundary / Touchdown Total + AMS	1.25 / 24 oz + 2 qt	96	98	98	59.1	43.05	248
13	Valor SX / Roundup OriginalMax + AMS	2 oz / 22 oz + 4 qt	93	98	98	58.0	40.71	245
14	Valor SX + Python / Roundup OriginalMax + AM	1.5 oz + 0.5 oz / 22 oz + 3 q	92	98	98	56.8	42.59	237
15	Valor SX + Sencor / Roundup OriginalMax + AMS	1.5 oz + 3 oz / 22 oz + 3 q	91	98	98	58.2	41.87	244
	POST II (6-inch weeds)							
16	Weed Free	-	100	100	100	56.1	0.00	276
17	Sequence + AMS	2.5 pt + 2 qt	94	98	97	57.4	36.56	246
	POST I (4-inch weeds)/POST III(Canopy)							
18	Roundup WeatherMax + AMS	22 oz + 3 qt /	97	98	98	57.4	49.04	233
	Roundup Weather Max + AMS	22 oz + 3 qt						
	POST II (6-inch weeds)							
19	Glyphomax XRT + First Rate + AMS	24 oz + 0.3 oz + 3 qt	96	98	98	56.9	35.39	244
20	Harmony GT + Roundup OriginalMax + AMS	0.33 oz + 22 oz + 4.7	97	98	98	55.5	30.17	243
21	Harmony GT + Classic + Roundup OriginalMax + AMS	0.33 oz + 0.33 oz + 22 oz + 4.7	95	98	98	57.8	34.41	250
22	Clearout 41 Plus + AMS	32 oz + 3 qt	95	98	98	56.4	24.88	252
23	Glyphomax XRT + AMS	24 oz + 3 qt	93	98	97	57.0	27.96	252
24	Roundup WeatherMax+AMS	22 oz + 3 qt	94	98	97	54.9	31.39	239
		LSD(0.10)	4	1	2	3.3		16

Weed emergence patterns and the effect of time of weed removal on early planted soybean yield at Rochester, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Jeffrey L. Gunsolus, and Kristal L. Schaufler

The objective of this trial was to evaluate weed emergence patterns and the effect of time of weed removal on early planted soybean yield in southeastern Minnesota. The research site was a Lawler loam series containing 2.7% organic matter with a pH of 6.9 and soil test P, K and S levels of 71 ppm, 219 ppm, and 5 ppm, respectively. The previous crop was corn. The field was chisel plowed in the fall, spring disked and field cultivated twice before planting. The soybean variety, Latham L-497RR was planted on May 9, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. A randomized complete block design with four replications was used. Preemergence (PRE) and postemergence (POST I, POST II, POST III, POST IV, POST V, and POST VI) treatments were applied with a tractor-mounted sprayer, delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Application dates, environmental conditions, and crop and weed stages are listed below. Field conditions were extremely dry in June and most of July.

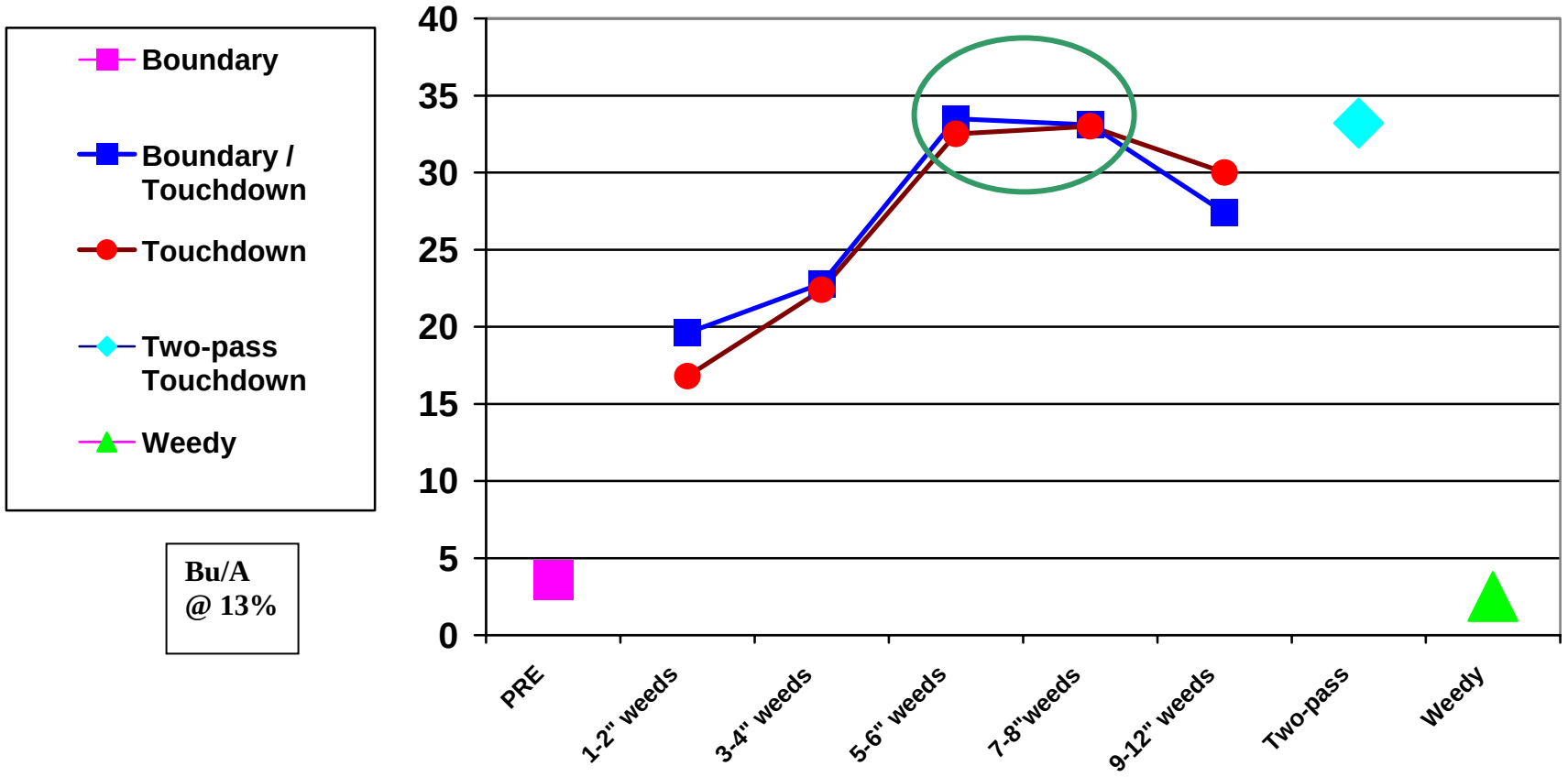
CONCLUSIONS: The primary weeds in the early planted soybean trial were giant ragweed and giant foxtail. The treatments of Boundary followed by Touchdown applied at 1 to 2 inch and 3 to 4 inch weeds resulted in lower soybean yields due to competition from giant ragweed emerging after the Touchdown application. The treatments with Touchdown applied alone at the same weed growth stages resulted in depressed soybean yields and competition from both giant ragweed and giant foxtail emerging after the Touchdown was applied. In this trial, a one-pass Touchdown application on 5 to 6, 7 to 8, or 9-12 inch weeds maximized yield and economic return. The two-pass Touchdown system also resulted in top soybean yields and is a very effective and risk efficient system. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Date	May 9	June 2	June 6	June 13	June 16	June 21	June 30
Treatment	PRE	POST I	POST II	POST III	POST IV	POST V	POST VI
Temperature (F)							
air	64	68	84	72	73	83	73
soil	58	70	85	64	67		85
Relative humidity (%)	75	58	40	73	44	49	57
Wind (mph)	16	14	8	12	6	12	29
Soil Moisture	Adequate	Adequate	Wet	Dry	Dry	Dry	Dry
Cloud cover (%)	80	10	15	95	10	15	10
Soybean							
stage	seeded	VC	VC	V1-V2	V2	V3	8 Nodes
height (inch)	--	2.0	3.0	6.5	7.3	10.4	14.3
Giant ragweed							
weed density (ft^2)	--	2.5	2.5	2.5	2.5	2.5	2.5
height (inch)	--	2.0	4.0	8.3	11.5	15.5	13.0
Common lambsquarters							
weed density (ft^2)	--	5.6	5.6	5.6	5.6	5.6	5.6
height (inch)	--	1.0	1.3	3.5	3.0	7.3	5.2
Common waterhemp							
weed density (ft^2)	--	5.3	5.3	5.3	5.3	5.3	5.3
height (inch)	--	0.5	0.9	2.5	3.3	2.8	3.3
Giant foxtail							
weed density (ft^2)	--	13.4	13.4	13.4	13.4	13.4	13.4
height (inch)	--	1.0	1.6	6.8	7.1	9.2	7.5
Rainfall after application (inch)							
week 1	1.07	1.82	2.15	0.34	0.15	1.14	0.16
week 2	1.75	0.54	0.25	1.14	1.25	0.16	0.0
week 3	0.31	0.15	1.14	0.16	0.07	0.0	1.54

Table. Effect of time of weed removal on yield of early planted soybean at Rochester, MN in 2005.

Treatment[a]	Rate	Application Time Weed Height	Soybean moisture	Soybean yield[b]	c
	(rate/A)	(inch)	(%)	(bu/A)	
PRE					
Boundary	1.5 pt	0	10.4	3.6	f
PRE / POST I					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	1-2 inch	10.8	19.6	de
POST I					
Touchdown Total + AMS	24 oz + 2.5 lb	1-2 inch	10.7	16.8	e
PRE / POST II					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	3-4 inch	10.7	22.8	cd
POST II					
Touchdown Total + AMS	24 oz + 2.5 lb	3-4 inch	11.3	22.4	cde
PRE / POST III					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	5-6 inch	10.4	33.5	a
POST III					
Touchdown Total + AMS	24 oz + 2.5 lb	5-6 inch	10.7	32.5	ab
PRE / POST IV					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	7-8 inch	10.7	33.1	a
POST IV					
Touchdown Total + AMS	24 oz + 2.5 lb	7-8 inch	10.5	33.0	ab
PRE / POST V					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	9-12 inch	10.5	27.4	bc
POST V					
Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	9-12 inch	10.3	30.0	ab
POST II / POST VI					
Touchdown Total + AMS / Touchdown Total + AMS	24 oz + 2.5 lb / 24 oz + 2.5 lb	3-4 inch / regrowth	10.7	33.2	a
Weed-free Check			10.6	34.1	a
Untreated			10.6	2.5	f
LSD (P=0.10)			0.4	5.7	

a. AMS = spray grade ammonium sulfate, b. Yield at 13% moisture, c. Yields followed by the same letter do not significantly differ.


Boundary
Boundary / Touchdown
Touchdown
Two-pass Touchdown
Weedy
Bu/A @ 13%
40
35
30
25
20
15
10
5
0
PRE
1-2" weeds
3-4" weeds
5-6" weeds
7-8"weeds
9-12" weeds
Two-pass
Weedy

Weed emergence patterns and the effect of time of weed removal on late planted soybean yield at Rochester, MN in 2005.

Breitenbach, Fritz R., Lisa M. Behnken, Jeffrey L. Gunsolus, and Angela L. White

The objective of this trial was to evaluate weed emergence patterns and the effect of time of weed removal on late planted soybean yield in southeastern Minnesota. The research site was a Lawler loam series containing 2.7% organic matter with a pH of 6.9 and soil test P, K, and S levels of 71 ppm, 219 ppm, and 5 ppm, respectively. The previous crop was corn. The field was chisel plowed in the fall, spring disked and field cultivated twice before planting. The soybean variety, Producers 210 RR, was planted on May 27, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. A randomized complete block design with four replications was used. Preemergence (PRE) and postemergence (POST I, POST II, POST III, POST IV, POST V, and POST VI) treatments were applied with a tractor-mounted sprayer, delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Application dates, environmental conditions, and crop and weed stages are listed below. Conditions were extremely dry in June and most of July.

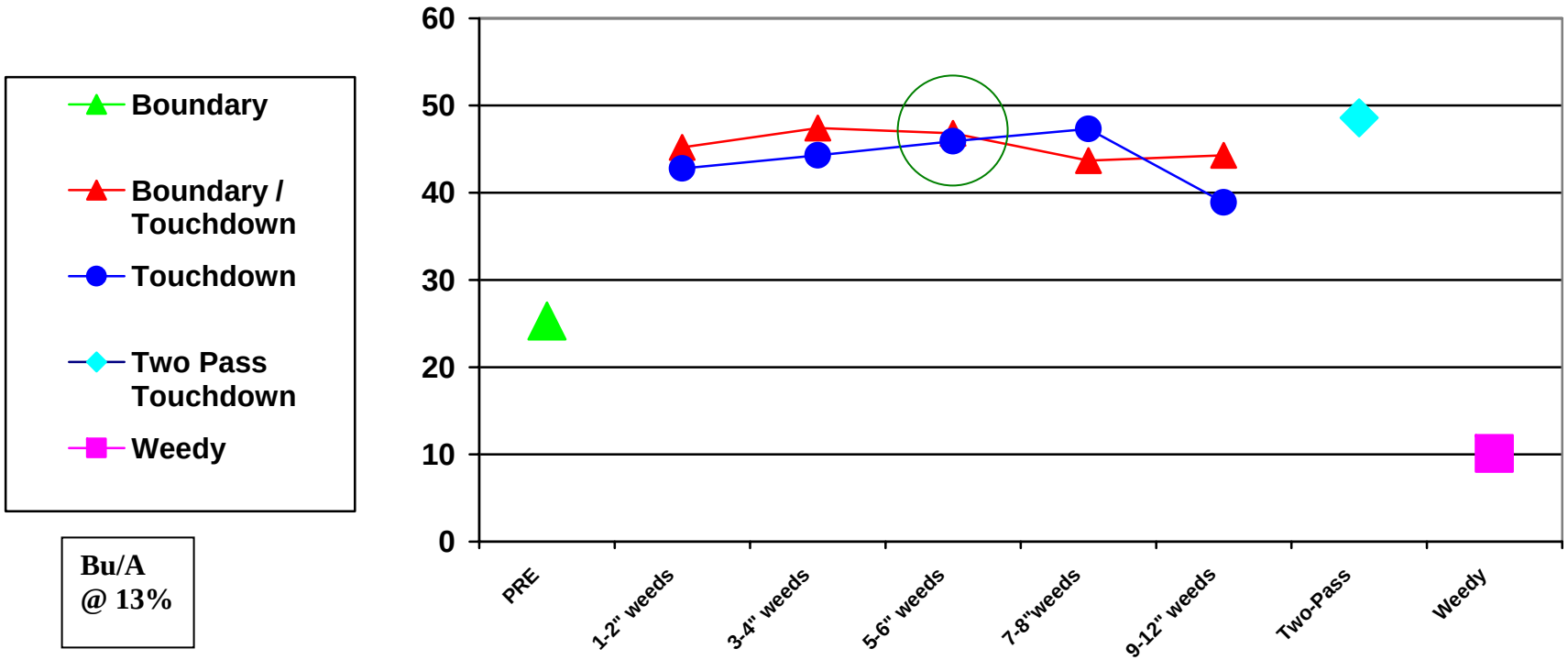
CONCLUSIONS: Delaying planting until May 27 changed the intensity of weed pressure and the primary species in the trial. Giant foxtail and giant ragweed were the main weed species, however giant foxtail was the primary problem in the late planted beans compared to giant ragweed as the main weed problem in the early planted soybean trial, pg. F-19. The one-pass Touchdown Total program maximized soybean yield when applied before weeds reached 9 inches. Giant foxtail was the primary weed in the treatments without Boundary, however early season competition from the foxtail did not result in a significant reduction in soybean yield except when controlled at 9-12 inches. There was no difference in soybean yield among all timings of Touchdown Total applications when made following a PRE application of Boundary. The two-pass Touchdown system is also a very effective and risk efficient system. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Date	May 27	June 13	June 16	June 21	June 25	June 30	July 22
Treatment	PRE	POST I	POST II	POST III	POST IV	POST V	POST VI
Temperature (F)							
air	52	72	73	83	79	73	80
soil	59	63	60		85	79	
Relative humidity (%)	80	73	44	49	65	57	69
Wind (mph)	16	12	6	12	10	29	6
Soil Moisture	Adequate	Dry	Dry	Dry	Dry	Dry	Dry
Cloud cover (%)	100	95	10	15	10	10	40
Soybean							
stage	seeded	VC	V1	V2	V3	7 nodes	R3
height (inch)	--	3.4	3.9	6.3	8.0	13.5	22.0
Giant ragweed							
weed density (ft^2)	--	1.6	1.6	1.6	1.6	1.6	1.6
height (inch)	--	3.3	4.4	8.0	14.0	19.3	12.0
Common lambsquarters							
weed density (ft^2)	--	2.0	2.0	2.0	2.0	2.0	2.0
height (inch)	--	0.9	1.6	2.9	2.0	4.8	7.0
Common waterhemp							
weed density (ft^2)	--	1.0	1.0	1.0	1.0	1.0	1.0
height (inch)	--	2.0	1.4	2.8	2.0	4.8	7.0
Giant foxtail							
weed density (ft^2)	--	15	15	15	15	15	15
height (inch)	--	1.6	3.6	5.8	10	9.0	7.0
Rainfall after application (inch)							
week 1	0.14	0.34	0.15	1.14	1.23	0.16	3.56
week 2	2.17	1.14	1.25	0.16	0.17	0.0	0.0
week 3	0.19	0.16	0.07	0.0	0.0	1.54	1.75

Table. Effect of time of weed removal on yield of late planted soybean at Rochester, MN in 2005.

Treatment[a]	Rate	Application Time Weed Height	Soybean moisture	Soybean yield[b]	c
	(rate/A)	(inch)	(%)	(bu/A)	
PRE					
Boundary	1.5 pt	0	14.1	25.3	d
PRE / POST I					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	1-2 inch	13.8	45.2	abc
POST I					
Touchdown Total + AMS	24 oz + 2.5 lb	1-2 inch	13.7	42.8	bc
PRE / POST II					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	3-4 inch	13.6	47.4	ab
POST II					
Touchdown Total + AMS	24 oz + 2.5 lb	3-4 inch	13.8	44.3	abc
PRE / POST III					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	5-6 inch	13.4	46.8	ab
POST III					
Touchdown Total + AMS	24 oz + 2.5 lb	5-6 inch	13.4	45.9	ab
PRE / POST IV					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	7-8 inch	13.5	43.7	bc
POST IV					
Touchdown Total + AMS	24 oz + 2.5 lb	7-8 inch	13.4	47.3	ab
PRE / POST V					
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	9-12 inch	13.7	44.3	abc
POST V					
Touchdown Total + AMS	1.5 pt / 24 oz + 2.5 lb	9-12 inch	13.3	38.9	c
POST II / POST VI					
Touchdown Total + AMS / Touchdown Total + AMS	24 oz + 2.5 lb / 24 oz + 2.5 lb	3-4 inch / regrowth	13.6	48.6	ab
Weed-free Check			13.6	51.0	a
Untreated			15.6	10.1	e
LSD (P=0.10)			0.6	6.9	

a. AMS = spray grade ammonium sulfate, b. Yield at 13% moisture, c. Yields followed by the same letter do not significantly differ from each other.


Boundary
Boundary / Touchdown
Touchdown
Two Pass Touchdown
Weedy
Bu/A @ 13%
60
50
40
30
20
10
0
PRE
1-2" weeds
3-4" weeds
5-6" weeds
7-8"weeds
9-12" weeds
Two-Pass
Weedy

Weed Emergence Patterns and the Effect of Time of Weed Removal on Soybean Yield

- In 2004 & 2005, research compared 5 glyphosate timings (1”, 3”, 5”, 7” and 9” weed heights), with and without a ½-rate of a PRE herbicide, on crop yield and economic returns
- Studies were conducted at six locations for soybean in 2004 and five locations for soybean in 2005
- Research Team: Jeffrey Gunsolus, Fritz Breitenbach, Tom Hoverstad, Jodie Getting, George Nelson and Lisa Behnken, University of Minnesota

Major weeds in soybean 2004 and 2005

Lamberton (04/05):
Yellow foxtail, **Common lambsquarters**, Redroot pigweed

Luverne (04/05):
Giant foxtail, **Common lambsquarters, Tall waterhemp**

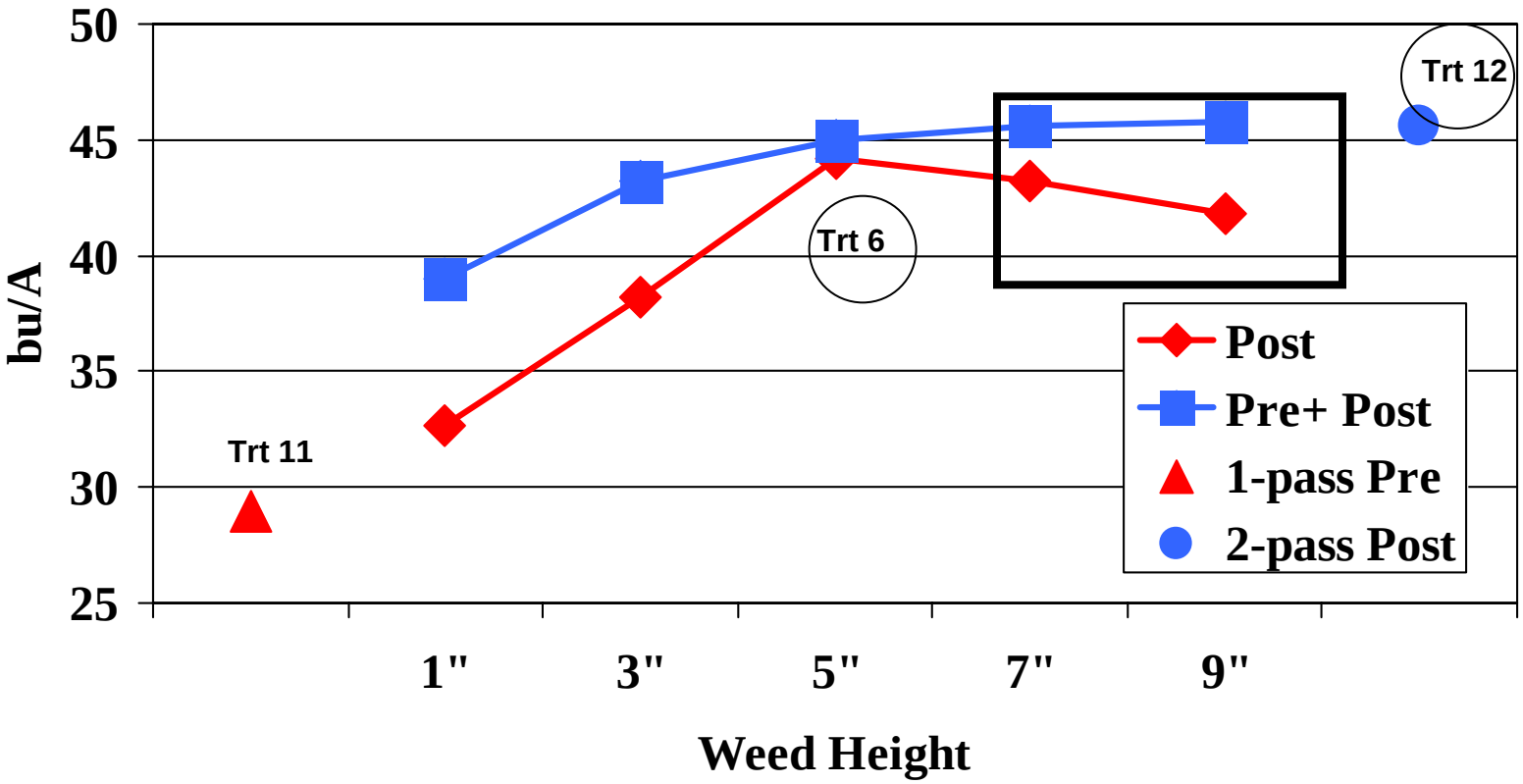
Morris (04/05):
Green foxtail, **Common lambsquarters**, Powell amaranth, Wild mustard

Potsdam (04):
Wild proso millet, Giant ragweed, **Common lambsquarters**, Velvetleaf

Rochester (04/05):
Giant foxtail, Giant ragweed, **Common waterhemp, Common lambsquarters**

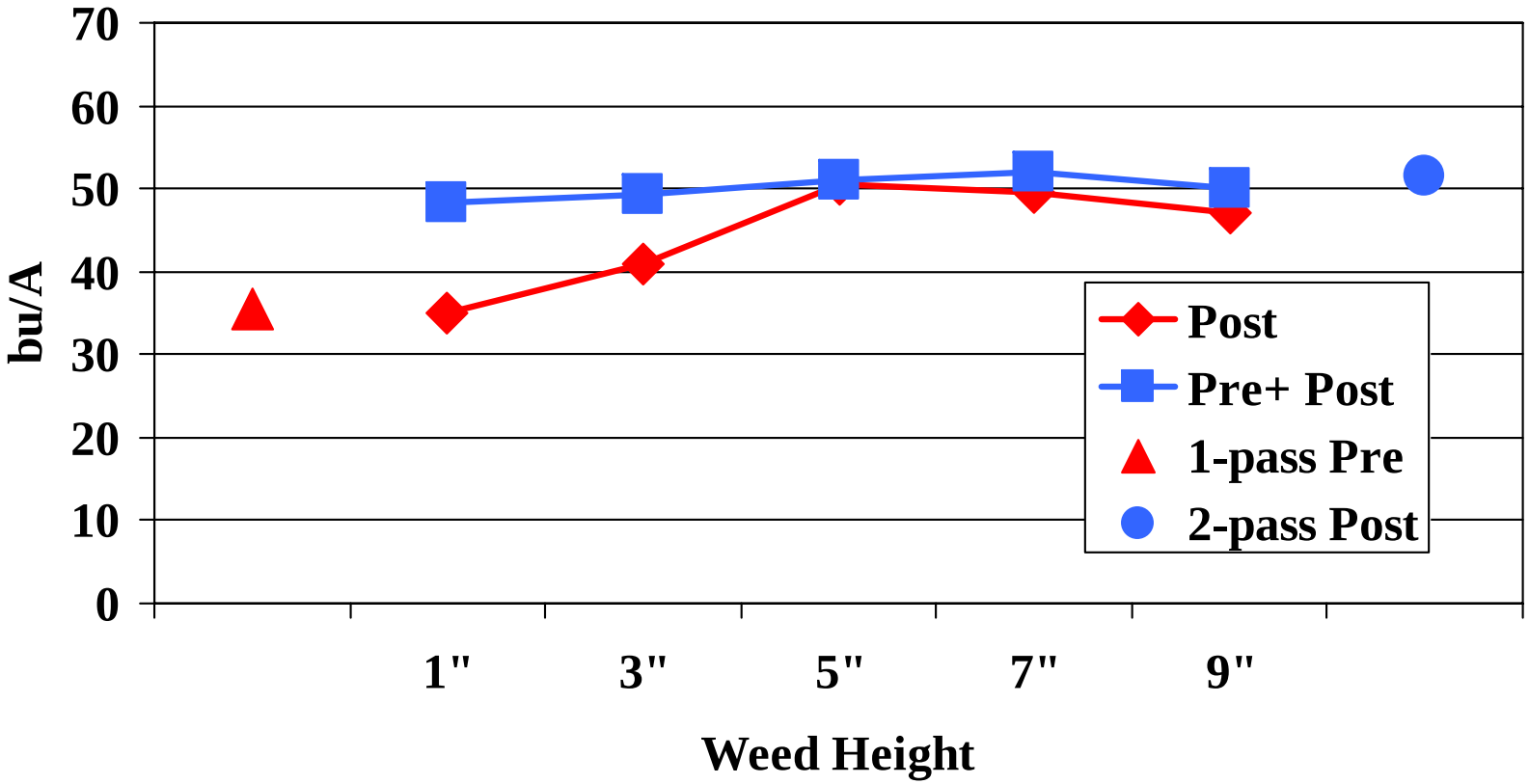
Waseca (04/05):
Giant foxtail, **Common lambsquarters,** Velvetleaf, Common ragweed, Redroot pigweed (04) & Common cocklebur (05)

Glyphosate Timing and Soybean Yield Across Locations, 2004



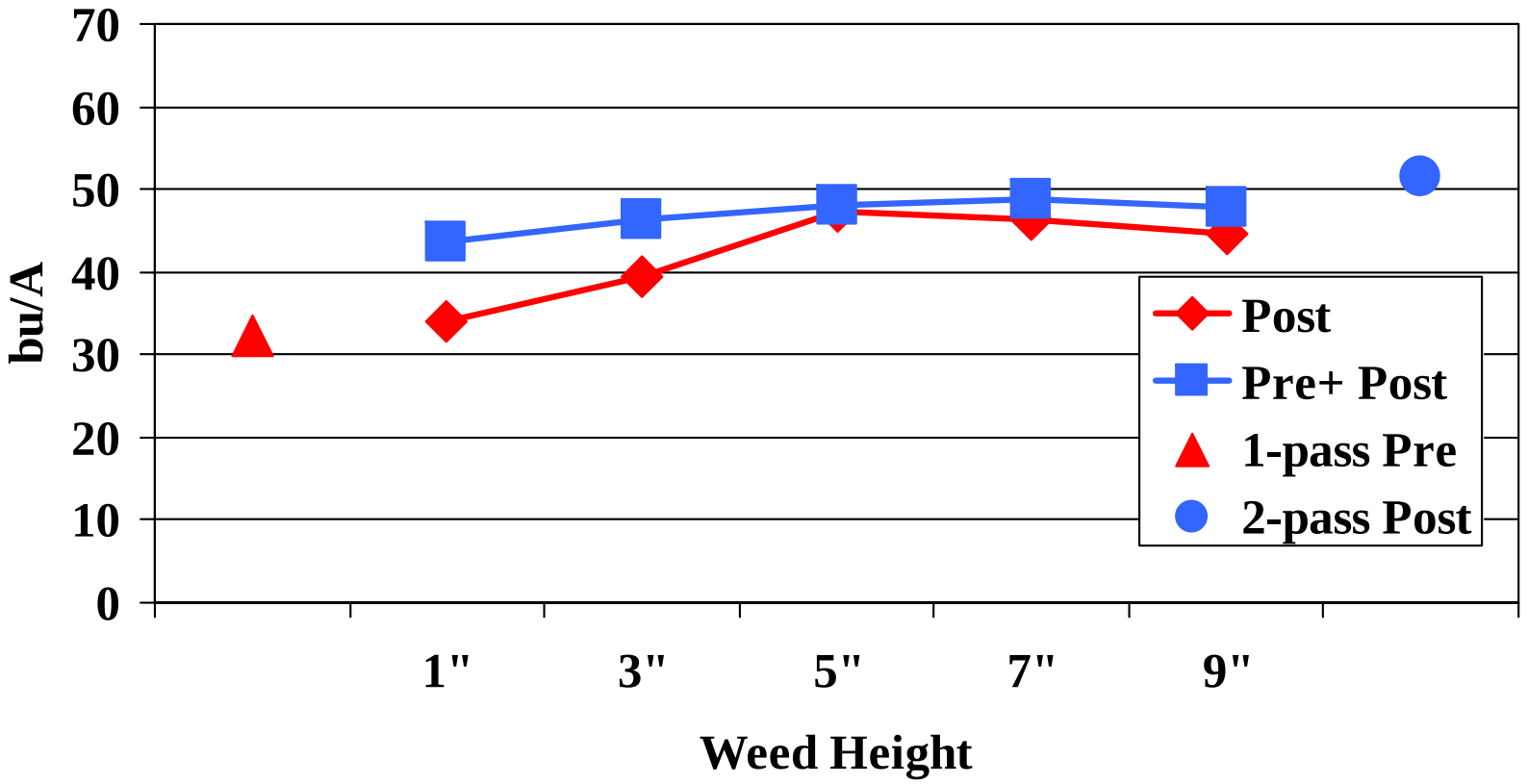
Trt 6– Touchdown Total (24 oz/A) + AMS at 5 inch weeds
Trt 11 – Boundary (1.5 pt/A) PRE
Trt 12 – Touchdown Total + AMS / Touchdown Total + AMS at 3"/ 2-4" regrowth

Glyphosate Timing and Soybean Yield Across Locations 2005



Pre + Post - Boundary (1.5 pt/A) + Touchdown Total (24 oz/A) + AMS
Post - Touchdown Total (24 oz/A) + AMS
1-pass Pre – Boundary (1.5 pt/A)
2-pass Post - Touchdown Total + AMS / Touchdown Total + AMS at 3”/ 2-4” regrowth

Glyphosate Timing and Soybean Yield Across Locations 2004-2005



Pre + Post - Boundary (1.5 pt/A) + Touchdown Total (24 oz/A) + AMS
Post - Touchdown Total (24 oz/A) + AMS
1 pass Pre – Boundary (1.5 pt/A)
2-pass Post - Touchdown Total + AMS / Touchdown Total + AMS at 3”/ 2-4” regrowth

Soybean Summary **2004 & 2005**

- One-pass glyphosate (5 inch weeds) could maximize yield and return.
- Application of glyphosate too early (less than 5 inch weeds) reduced crop yield and economic return.
- PRE/POST (5 inch weeds or larger) provided less favorable economic returns.
- Two pass glyphosate is very effective and risk efficient.

PRODUCTION MANAGEMENT

Impact of Insecticide Seed Treatments and Planting Dates on Corn Plant Health at Rochester, Minnesota in 2005.

Behnken, Lisa M., Fritz R. Breitenbach, Angela L White, and Kristal L. Schaufler

The objective of this study was to evaluate emergence, plant stand, and grain yield of corn when treated with insecticide seed treatments and planted at three different dates. The trial was located at Rochester, MN. Field history is 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 2.0 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 with grain weight and moisture recorded. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Field History for Insecticide Seed Treatments on Corn Plant Health.

	Rochester		
Planting Dates	April 21, May 4, and May 16	**Soil Test Results**	
Soil Type	Lawler Loam Series	**pH**	6.8
Fertilizer (N-P-K) Spring App.	144lb/A nitrogen 23 lb/A phosphorus 120 lb/A potash 24 lb/A sulfur	**Organic Matter** **Phosphorus** **Potassium** **Sulfur**	3.2 % 52 ppm 154 ppm 6 ppm
Herbicide Pre/Post	Lumax 3pts/Liberty 32 oz	**Corn Hybrid**	Pioneer 38H69
Harvest Date	October 18, 2005	**Seeding Rate**	35,000 S/A
Tillage	Conventional	**Planting Depth**	2.0 inches
Previous Crop	Alfalfa (3rd Year)		

Table 2. Corn emergence by date per 10 foot of row at Rochester, MN in 2005.

Treatment	**Rate MG A/Seed**	**Planting Date**	**May 10**	**May 16**	**May 19**	**May 23**	**May 27**	**May 31**	**June 03**	**June 06**	**June 13**
Pioneer 38H69	-	April 21	13.0	17.9	18.1	18.6	18.9	18.9	19.3	18.8	18.6
Pioneer 38H69 W/Poncho	0.25	April 21	13.5	17.9	17.3	17.5	17.1	17.3	17.1	16.9	17.0
Pioneer 38H69 W/Poncho	1.25	April 21	13.8	17.5	17.4	18.3	18.4	18.5	18.6	18.3	18.4
Pioneer 38H69 W/Cruiser	1.25	April 21	8.3*	16.6	16.5	17.3	17.0	17.4	17.4	17.5	17.0
Pioneer 38H69	-	May 04	0	10.8	16.6	18.3	19.1	19.3	19.1	19.0	19.1
Pioneer 38H69 W/Poncho	0.25	May 04	0	12.4	17.5	19.0	18.9	19.3	19.4	19.3	19.0
Pioneer 38H69 W/Poncho	1.25	May 04	0	12.8	17.5	19.0	19.1	19.6	19.4	19.5	19.6
Pioneer 38H69 W/Cruiser	1.25	May 04	0	1.9*	13.5*	18.8	19.6	19.6	19.4	20.1	19.8
Pioneer 38H69	-	May 16	0	0	0	0	17.1	19.0	19.6	19.5	19.1
Pioneer 38H69 W/Poncho	0.25	May 16	0	0	0	0	16.0	17.9	18.4	18.3	18.0
Pioneer 38H69 W/Poncho	1.25	May 16	0	0	0	0	15.5	18.9	19.0	19.3	18.4
Pioneer 38H69 W/Cruiser	1.25	May 16	0	0	0	0	14.3**	20.3	20.3	20.4	20.1
LSD (P=0.10)			**1.4**	**1.7**	**1.5**	**1.7**	**2.2**	**2.2**	**2.1**	**1.9**	**1.9**

*** Note significant delay in emergence of this treatment compared to other treatments**

**** Note significant delay in emergence of this treatment compared to untreated**

Table 3. Corn plant population per acre pooled over all planting dates at Rochester MN, in 2005.

Treatment	Plant Population/A Pooled by Treatment over all Planting Dates	
Pioneer 38H69	33,000	a
Pioneer 38H69 W/Poncho 250	31,400	b
Pioneer 38H69 W/Poncho 1250	32,800	ab
Pioneer 38H69 W/Cruiser 1250	33,000	a
LSD (P=0.10)	1,500	
Means followed by the same letter do not differ significantly		

Chart. Minimum and maximum soil temperature in degrees F from April 21 to May 31, at Waseca MN, 2005.

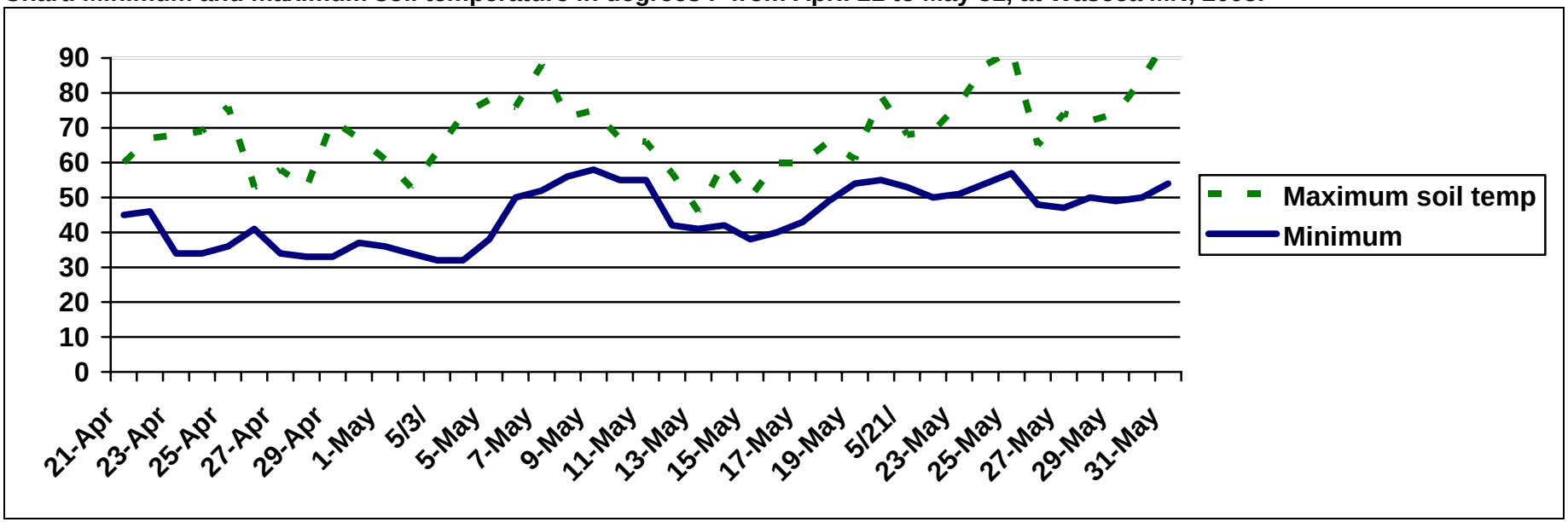


Table 4. Corn grain moisture and yield at Rochester, MN in 2005

Treatment	Rate MG A/Seed	Planting Date	Grain Moisture %	Grain Yield Bu/A	Means followed by the same letter do not differ significantly
Pioneer 38H69	-	April 21	18.6	129.5	f
Pioneer 38H69 W/Poncho	0.25	April 21	18.4	132.4	ef
Pioneer 38H69 W/Poncho	1.25	April 21	19.2	146.0	de
Pioneer 38H69 W/Cruiser	1.25	April 21	19.2	139.8	def
Pioneer 38H69	-	May 04	18.9	140.6	def
Pioneer 38H69 W/Poncho	0.25	May 04	18.8	142.5	def
Pioneer 38H69 W/Poncho	1.25	May 04	19.4	162.6	bc
Pioneer 38H69 W/Cruiser	1.25	May 04	18.9	152.0	cd
Pioneer 38H69	-	May 16	19.6	172.2	ab
Pioneer 38H69 W/Poncho	0.25	May 16	19.8	164.8	bc
Pioneer 38H69 W/Poncho	1.25	May 16	20.6	181.7	a
Pioneer 38H69 W/Cruiser	1.25	May 16	20.4	184.3	a
LSD (P=0.10)			**0.7**	**14.8**	

Table 5. Corn grain yield pooled over all planting dates at Rochester MN, in 2005

Treatment	Grain Yield Pooled by Treatment over all Planting Dates (Bu/A)
Pioneer 38H69	147 b
Pioneer 38H69 W/Poncho 250	147 b
Pioneer 38H69 W/Poncho 1250	163 a
Pioneer 38H69 W/Cruiser 1250	159 a
LSD (P=0.10)	11
Means followed by the same letter do not differ significantly	

Conclusions:

1. Plant emergence was delayed in the treatments with Cruiser compared to the other treatments, Table 2.
2. The delay in emergence may have been related to cold soil temperatures soon after planting, which may have slowed the breakdown of the applied seed coating, see chart.
3. Corn seed treated with Poncho 250 had an overall emergence and plant population significantly lower than the untreated and seed treated with Cruiser, when averaged over all planting dates, Table 3.
4. Corn grain yield was impacted by planting date, where all treatments in the April 21 planting date yielded lower than the May 16 planting date. It is speculated that the extreme early season drought conditions at Rochester had a negative impact on pollination in the early planted.
5. When yield was pooled over all planting dates, the untreated corn and the corn treated with Poncho 250, yielded less than the corn treated with Poncho 1250 or Cruiser.
6. This trial will be repeated in 2006. There will be multiple sites and only one planting date. Treatments will include Poncho 1250, Cruiser, an insecticide and an untreated.

Soybean response to defoliation caused by simulated Asian soybean rust and delayed fungicide applications at Rochester, MN in 2005. Behnken, Lisa M., Fritz R. Breitenbach, Krista M. Sheehan and Angela L. White.

The objective of this trial was to evaluate the response of soybean to a simulated defoliation caused by Asian soybean rust and a delayed fungicide application in southeastern Minnesota. The research site was a Lawler loam series containing 2.9% organic matter with a pH of 6.0 and soil test P, K, and S levels of 74 ppm, 268 ppm, and 5 ppm, respectively. The previous crop was corn. The field was chisel plowed in the fall, spring disked and field cultivated twice before planting. The trial was planted with a 4-row John Deere 7000 planter. The soybean variety Producers 210 was planted on May 27, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. A randomized complete block design with four replications was used. This trial was also conducted in St. Paul and at the SWROC in Lamberton. Results from all three locations are reported. A similar trial will be repeated in 2006. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Soybean protein, oil, moisture and yield response to defoliation caused by simulated infection of Asian Soybean rust and delayed fungicide applications at Rochester, MN in 2005.

Character Rated Rating Data Type			Soybean Protein	Soybean Oil	Soybean Moisture	Soybean Yield
a.	**Treatment**	**Description**	(%)	(%)	(%)	(bu/A)
1	Control	No soybean rust infection	33.7 d	19.2 abc	10.4 a	48.8 bc
2	Simulated prophylactic fungicide application at R1	Remove upper leaves @ R1 + 10	33.6 d	19.3 abc	10.1 ef	44.9 cd
3	Simulated prophylactic fungicide application at R1	Remove upper leaves @ R1 + 20	34.3 bc	19.2 abc	10.0 f	36.9 ef
4	Simulated prophylactic fungicide application at closed canopy	Remove upper leaves @ closed canopy + 10	34.4 bc	18.9 bcd	10.3 bcd	47.1 c
5	Simulated prophylactic fungicide application at closed canopy	Remove upper leaves @ closed canopy + 20	34.0 cd	18.9 bcd	10.4 ab	47.0 c
6	Simulated delayed fungicide application at R1, 10 days after SBR infection	Remove lower 1/3 of R1 leaves @ R1	33.7 d	19.4 a	10.4 a	53.7 ab
7	Simulated delayed fungicide application at R1, 20 days after SBR infection	Remove lower 2/3 of R1 leaves @ R1	34.0 cd	19.3 ab	10.3 abc	48.9 abc
8	Simulated delayed fungicide application at R3, 10 days after SBR infection	Remove lower 1/3 of R3 leaves @ R3	33.7 d	19.3 ab	10.3 abc	54.9 a
9	Simulated delayed fungicide application at R3, 20 days after SBR infection	Remove lower 2/3 of R3 leaves @ R3	35.6 a	18.6 d	10.2 de	40.4 de
10	Simulated delayed fungicide application at R5, 10 days after SBR infection	Remove lower 1/3 of R5 leaves @ R5	34.8 b	18.8 cd	10.2 cd	44.3 cd
11	Simulated delayed fungicide application at R5, 20 days after SBR infection	Remove lower 2/3 of R5 leaves @ R5	35.3 a	18.5 d	10.3 bcd	32.6 f
LSD (P=.10)			0.6	0.5	0.1	6.1

a. Treatment Description Details

1. No rust infection occurs

Simulated prophylactic fungicide application – before soybean rust infection

2. Simulates an early (before rust infection) application of fungicide at R1 that provides protection for 10 days, leaving subsequently produced plant leaves unprotected.

3. Simulates an early (before rust infection) application of fungicide at R1 that provides protection for 20 days, leaving subsequently produced plant leaves unprotected.

4. Simulates an early (before rust infection) application of fungicide at closed canopy that provides protection for 10 days, leaving subsequently produced plant leaves unprotected.

5. Simulates an early (before rust infection) application of fungicide at closed canopy that provides protection for 20 days, leaving subsequently produced plant leaves unprotected.

Delayed fungicide applications – after soybean rust infection

6. Simulates an infection that goes untreated 10 days after infection. Simulated fungicide application made at R1, soybean rust is present, lower 1/3 of canopy leaves are lost.

7. Simulates an infection that goes untreated 20 days after infection. Simulated fungicide application made at R1, soybean rust is present, lower 2/3 of canopy leaves are lost.

8. Simulates an infection that goes untreated 10 days after infection. Simulated fungicide application made at R3, soybean rust is present, lower 1/3 of canopy leaves are lost.

9. Simulates an infection that goes untreated 20 days after infection. Simulated fungicide application made at R3, soybean rust is present, lower 2/3 of canopy leaves are lost.

10. Simulates an infection that goes untreated 10 days after infection. Simulated fungicide application made at R5, soybean rust is present, lower 1/3 of canopy leaves are lost.

11. Simulates an infection that goes untreated 20 days after infection. Simulated fungicide application made at R5, soybean rust is present, lower 2/3 of canopy leaves are lost.

Table 2. Soybean yield response to defoliation caused by simulated infection of Asian Soybean rust and delayed fungicide applications at St. Paul, Rochester, and SWROC in Lamberton, MN in 2005.

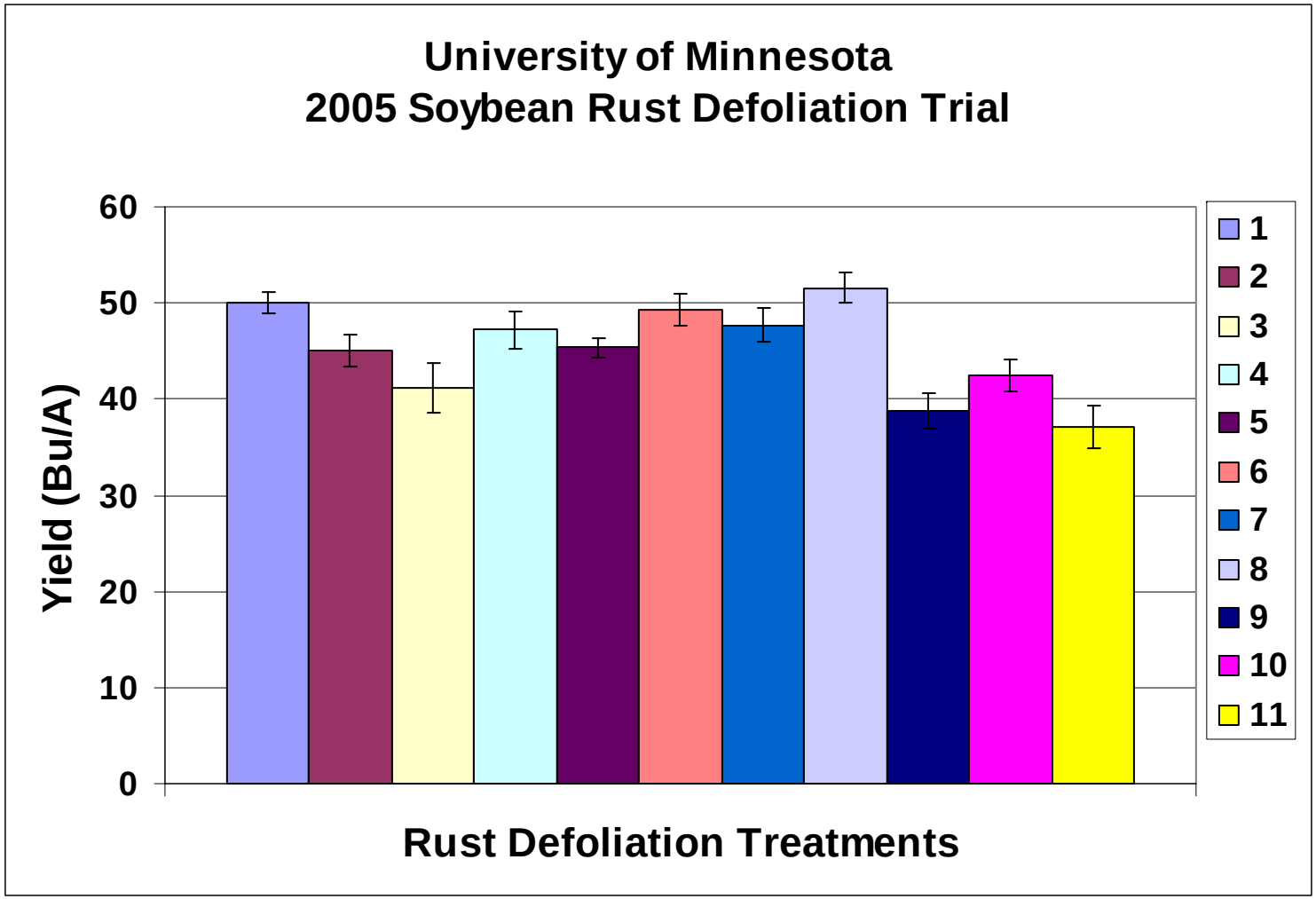
No.	Treatment Name	Description	St. Paul Yield (Bu/A)		Rochester Yield (Bu/A)		SWROC Yield (Bu/A)	
1	Control		53.8	a	49.3	abc	49.5	a
2	Simulated prophylactic fung ap	Remove upper leaves @ R1 + 10	48.1	abc	44.9	cd	42.1	ab
3	Simulated prophylactic fung ap	Remove upper leaves @ R1 + 20	49.7	ab	36.9	ef	36.9	b
4	Simulated prophylactic fung ap	Remove upper leaves @ closed canopy + 10	47.3	bcd	47.2	bcd		
5	Simulated prophylactic fung ap	Remove upper leaves @ closed canopy + 20	43.7	cd	47.0	bcd		
6	Simulated delayed fung app SBR	Remove lower 1/3 of R1 leaves @ R1	47.1	bcd	53.8	ab	47.0	a
7	Simulated delayed fung app SBR	Remove lower 2/3 of R1 leaves @ R1	46.1	bcd	48.9	abc	48.1	a
8	Simulated delayed fung app SBR	Remove lower 1/3 of R3 leaves @ R3	50.6	ab	54.9	a	49.2	a
9	Simulated delayed fung app SBR	Remove lower 2/3 of R3 leaves @ R3	42.6	cd	40.4	de	33.4	b
10	Simulated delayed fung app SBR	Remove lower 1/3 of R5 leaves @ R5	43.1	cd	44.3	cd	40.1	ab
11	Simulated delayed fung app SBR	Remove lower 2/3 of R5 leaves @ R5	41.6	d	32.6	f		
LSD (P=.05)			**5.8**		**6.9**		**9.1**	

Table 3. Soybean yield, averaged over three locations, in response to defoliation caused by simulated infection of Asian Soybean rust and delayed fungicide applications at St. Paul, Rochester, and SWROC in Lamberton, MN in 2005.

Trt No.	Treatment Name	Description	Average Over 3 Locations Yield (Bu/A)	
1	Control		50.0	ab
2	Simulated prophylactic fung ap	Remove upper leaves @ R1 + 10	45.2	cd
3	Simulated prophylactic fung ap	Remove upper leaves @ R1 + 20	41.2	def
4	Simulated prophylactic fung ap	Remove upper leaves @ closed canopy + 10	47.2	abc
5	Simulated prophylactic fung ap	Remove upper leaves @ closed canopy + 20	45.4	bcd
6	Simulated delayed fung app SBR	Remove lower 1/3 of R1 leaves @ R1	49.3	abc
7	Simulated delayed fung app SBR	Remove lower 2/3 of R1 leaves @ R1	47.7	abc
8	Simulated delayed fung app SBR	Remove lower 1/3 of R3 leaves @ R3	51.6	a
9	Simulated delayed fung app SBR	Remove lower 2/3 of R3 leaves @ R3	38.8	ef
10	Simulated delayed fung app SBR	Remove lower 1/3 of R5 leaves @ R5	42.5	de
11	Simulated delayed fung app SBR	Remove lower 2/3 of R5 leaves @ R5	37.10	f
LSD (P=.05)			**4.3**	

Table 4. Soybean protein, oil and protein + oil, averaged over three locations, in response to defoliation caused by simulated infection of Asian Soybean rust and delayed fungicide applications at St. Paul, Rochester, and SWROC in Lamberton, MN in 2005.

Trt. No.	Treatment Name	Description	Average Over 3 Locations Protein 13% DM		Average Over 3 Locations Oil 13% DM		Average Over 3 Locations Protein + Oil 13% DM	
1	Control		33.0	ab	19.9	a	52.9	a
2	Simulated prophylactic fung ap	Remove upper leaves @ R1 + 10	32.8	abc	19.6	b	52.4	c
3	Simulated prophylactic fung ap	Remove upper leaves @ R1 + 20	32.7	bc	19.8	ab	52.5	bc
4	Simulated prophylactic fung ap	Remove upper leaves @ closed canopy + 10	32.5	c	19.3	c	51.8	de
5	Simulated prophylactic fung ap	Remove upper leaves @ closed canopy + 20	32.4	c	19.3	c	51.7	e
6	Simulated delayed fung app SBR	Remove lower 1/3 of R1 leaves @ R1	32.7	bc	19.8	ab	52.5	bc
7	Simulated delayed fung app SBR	Remove lower 2/3 of R1 leaves @ R1	33.0	ab	19.7	ab	52.7	abc
8	Simulated delayed fung app SBR	Remove lower 1/3 of R3 leaves @ R3	32.7	bc	19.8	ab	52.5	bc
9	Simulated delayed fung app SBR	Remove lower 2/3 of R3 leaves @ R3	33.2	a	19.6	b	52.7	ab
10	Simulated delayed fung app SBR	Remove lower 1/3 of R5 leaves @ R5	32.7	bc	19.8	ab	52.4	bc
11	Simulated delayed fung app SBR	Remove lower 2/3 of R5 leaves @ R5	37.1	abc	19.2	c	52.0	d
LSD (P=.05)							**0.3**	


University of Minnesota
2005 Soybean Rust Defoliation Trial
Yield (Bu/A)
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
Rust Defoliation Treatments

Soybean plant health evaluation with seed treatments, fungicides and insecticides at Rochester, MN in 2005.

Behnken, Lisa M., Fritz R. Breitenbach, Kristal L. Schauffler, and Kira L. Stearns.

The objective of this trial was to evaluate soybean plant health and yield response when treated with a seed treatment, fungicides and insecticides in southeastern Minnesota. The research site was a Lawler loam series containing 2.6% organic matter with a pH of 7.0 and soil test P, K, and S levels of 51 ppm, 212 ppm, and 10 ppm, respectively. The previous crop was corn. The field was chisel plowed in the fall, spring disked and field cultivated twice before planting. The trial was planted with a 4-row John Deere 7000 planter equipped with cone units. The soybean variety NK S19-R5 was planted on May 18, 2005 at a depth of 1.5 inches in 30-inch rows at 150,000 seeds/A. Seed treatments included Apron Max and Cruiser Max. Headline fungicide and Warrior insecticide were applied at the soybean stages of R1 and R3, and in a split application at R1 and R3. A randomized complete block design with four replications was used. Application dates, environmental conditions, and crop and weed stages are listed below. Conditions were extremely dry in June and most of July.

Date	May 18	July 8	July 27
Treatment	Planted	POST I	POST II
Temperature (F)			
Air	50	66	64
soil	50		
Relative humidity (%)	69	78	62
Wind (mph)	0	7	5
Soybean			
stage	Planted	R1	R3
height (inch)		9.2	10
Aphids/Plant		23	97
Rainfall after application (inch)			
week 1		0.0	0.02
week 2		1.59	1.14
week 3		3.56	0.67

CONCLUSIONS

Plant Height

NK S19-R5 with the seed treatment Cruiser Max followed by an application of Headline fungicide at the R1 growth stage was 1.4 inches shorter than two treatments, Cruiser Max followed by Headline fungicide and Warrior insecticide applied at R1 and
Cruiser Max followed by a spilt application of Headline plus Warrior applied at both R1 and R3 growth stages.

Plant Color

Two treatments matured more rapidly (based on plant color), Cruiser Max followed by Warrior at R1 and Cruiser Max followed by a split application of Headline plus Warrior at R1 and R3. Treatments with Warrior insecticide applied at R1 matured more rapidly (as measured by plant color) than most of the other treatments.

Seeds per Pound

There were minor differences in seed size, as measured by the number of seeds per pound. NK S19-R5 with the seed treatment Apron Max resulted in smaller seed size (or higher number of seeds/pound) than the treatment with CruiserMax followed by Headline at R1 and Cruiser Max followed by Headline and Warrior at R3.

Soybean Yield – There were some differences in soybean yield among treatments, with yields ranging from 50.4 bu/A to 54.3 bu/A, however, the results are not conclusive based on one year of data at this location.

Soybean treated with Cruiser Max followed by an R3 application of Headline fungicide, or Warrior insecticide, or Headline plus Warrior resulted in a higher yield than the treatment of soybean with seed treatment of Apron Max. However, soybean treated with Cruiser Max followed by an R3 application of Headline fungicide was no different in yield than the soybean treated with Cruiser Max, or treated with Cruiser Max followed by Warrior at R3 or the Cruiser Max followed by Headline plus Warrior at R3.

The study will be repeated in 2006. (University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Soybean plant health as determined by plant height, maturity rating by color, seeds per pound, moisture and yield for soybean treated with seed treatments, fungicides and/or insecticides at Rochester, MN in 2005.

Crop Code Rating Data Type Rating Unit Rating Date	Soybean Height (in) 8/1/2005	Soybean Color[1] 9/2/2005	Soybean No of Seeds Seeds/lb 10/4/2005	Soybean Moisture (%) 10/4/2005	Soybean Yield (bu/A) 10/4/2005
Treatment					
NK S19-R5	32.7 ab	1.50 bcd	2302 ab	13.9 b	51.8 bc
NK S19-R5 w/ Apron Max	33.6 ab	1.25 d	2357 a	13.9 b	50.4 c
NK S19-R5 w/ Cruiser Max	33.6 ab	1.38 cd	2292 ab	14.0 ab	52.2 abc
NK S19-R5 w/ Cruiser Max + Headline R1	32.4 b	1.38 cd	2263 b	14.0 ab	50.9 bc
NK S19-R5 w/ Cruiser Max + Warrior R1	33.6 ab	2.38 a	2305 ab	14.0 ab	51.4 bc
NK S19-R5 w/ Cruiser Max + Headline + Warrior R1	33.8 a	2.13 ab	2296 ab	14.0 ab	51.1 bc
NK S19-R5 w/ Cruiser Max + Headline R3	33.7 ab	1.38 cd	2294 ab	14.0 ab	54.3 a
NK S19-R5 w/ Cruiser Max + Warrior R3	33.5 ab	2.00 abc	2291 ab	14.0 ab	52.7 ab
NK S19-R5 w/ Cruiser Max + Headline + Warrior R3	32.8 ab	1.38 cd	2280 b	14.0 ab	52.9 ab
NK S19-R5 w/ Cruiser Max + Headline + Warrior R1+R3	33.8 a	2.38 a	2317 ab	14.1 a	50.9 bc
LSD (P=.10)	1.3	0.64	72	0.2	2.2

1. Rating scale, 1 = Green, 2 = Green/Yellow, 3 = Yellow

The effect of seeding rate, date of planting and soybean seed treatment on soybean emergence, insect populations and yield at Rochester, MN in 2005. Behnken, Lisa M., Fritz R. Breitenbach, Corey W. Stever, and Matthew M. White.

The objective of this trial was to evaluate the effect of seeding rate, date of planting, and the use of seed treatments on soybean emergence, insect populations and yield in southeastern Minnesota. The research site was a Lawler loam series containing 2.6% organic matter with a pH of 6.9 and soil test P, K, and S levels of 29 ppm, 166 ppm, and 9 ppm, respectively. The previous crop was corn. The field was chisel plowed in the fall, spring disked and field cultivated twice before planting. The trial was planted with a 4-row John Deere 7000 planter equipped with cone units. The soybean variety NK S19-R5 was planted on April 28, May 5, and May 16, 2005 at a depth of 1.5 inches in 30-inch rows. Seeding rates were 80,000, 100,000, 120,000, 140,000 and 160,000 seeds/A. Seed treatments included ApronMax and Cruiser Max. A randomized complete block design with four replications was used. Conditions were extremely dry in June and most of July.

CONCLUSIONS:

Plant Emergence and Stand

- No difference was observed in plant emergence, plant population, or soybean grain yield among soybean seed treatments of ApronMax, CruiserMax or untreated when planted at April 28, Tables 1.
- For the May 5 planting date, the number of emerged plants in the untreated seed treatments was lower on May 23 and 27, Table 2.
- For the May 16 planting, untreated seed had a lower emergence on May 27, Table 3.
- When analyzed over all planting dates, seed treatments did not improve yield over the untreated seed, Table 4 and 5.

Soybean Aphids and Bean Leaf Beetles

- CruiserMax suppressed soybean aphid population on soybean at all planting dates, Table 6.
- The percent of plants infected with soybean aphids was lower on the first three evaluation dates at all planting dates, Table 7.
- Soybean aphid population reached the economic threshold level of 250 aphids/plant in the untreated plots on August 3, (the maximum reached was an average of 279/plant). However, the population never reached the economic injury level, Table 6.
- However, there was no impact on soybean yield when treated with CruiserMax.
- Bean leaf beetle numbers were too low in 2005 to differentiate results among the treatments, Table 8

Soybean Seeding Rate

- There was no difference in soybean yield among population treatments when compared at each planting date, April 28, May 5 or May 16, Table 9.
- When comparing a single seeding rate by planting date, soybean seeded at 160,000 seeds per acre on May 16 had a lower population, but a higher yield than when seeded on April 28, Table 9.

(University of Minnesota Extension Service, Regional Center, Rochester, MN).

Table 1. Soybean emergence, population, and grain yield for untreated and treated soybean planted on April 28 at Rochester, MN in 2005.

Crop Code Part Rated Rating Date		Soybean Emerged 5/10/2005	Soybean Emerged 5/15/2005	Soybean Emerged 5/23/2005	Soybean Emerged 5/27/2005	Soybean Emerged 5/31/2005	Soybean Emerged 6/6/2005	Soybean Emerged 6/14/2005	Soybean Population 6/14/2005	Soybean Yield
Treatment	**Seeding rate**	**(Plants per 10' of row)**							**(Plants/A)**	**(Bu/A)**
NK Brand S19-R5	80000	0.6 a	19 a	41 a	42 a	43 a	42 a	41 a	70567 a	45.7 a
NK Brand S19-R5 w/ ApronMax	80000	0.1 a	18 a	41 a	43 a	43 a	44 a	44 a	75794 a	39.5 a
NK Brand S19-R5 w/ Cruiser Max	80000	0.5 a	18 a	43 a	44 a	44 a	45 a	44 a	76666 a	42.6 a
LSD (P=.10)		1.1	6	5	3	4	4	5	6155	8.2

Means followed by same letter do not significantly differ (P=.10, LSD)

Table 2. Soybean emergence, population, and grain yield for untreated and treated soybean planted on May 5 at Rochester, MN in 2005.

Crop Code Part Rated Rating Date		Soybean Emerged 5/15/2005	Soybean Emerged 5/23/2005	Soybean Emerged 5/27/2005	Soybean Emerged 5/31/2005	Soybean Emerged 6/6/2005	Soybean Emerged 6/14/2005	Soybean Population 6/14/2005	Soybean Yield
Treatment	**Seeding rate**	**(Plants per 10' of row)**						**(Plants/A)**	**(Bu/A)**
NK Brand S19-R5	80000	0 a	33 b	37 b	38 a	38 a	38 a	66647 a	48.2 a
NK Brand S19-R5 w/ ApronMax	80000	0 a	40 a	42 a	43 a	43 a	43 a	75141 a	48.4 a
NK Brand S19-R5 w/ Cruiser Max	80000	0 a	37 ab	40 ab	40 a	42 a	41 a	71438 a	43.4 a
LSD (P=.10)		0	6	5	6	5	5	9213	5.8

Means followed by same letter do not significantly differ (P=.10, LSD)

Table 3. Soybean emergence, population, and grain yield for untreated and treated soybean planted on May 16 at Rochester, MN in 2005.

Crop Code Part Rated Rating Date		Soybean Emerged 5/23/2005	Soybean Emerged 5/27/2005	Soybean Emerged 5/31/2005	Soybean Emerged 6/6/2005	Soybean Emerged 6/14/2005	Soybean Population 6/14/2005	Soybean Yield
Treatment	**Seeding rate**	**(Plants per 10' of row)**					**(Plants/A)**	**(Bu/A)**
NK Brand S19-R5	80000	0 a	4 b	38 a	38 a	39 a	68607 a	42.3 a
NK Brand S19-R5 w/ ApronMax	80000	0 a	7 a	39 a	40 a	41 a	72092 a	43.2 a
NK Brand S19-R5 w/ Cruiser Max	80000	0 A	8 a	38 a	40 a	40 a	70132 a	41.6 a
LSD (P=.10)		0	3	6	5	4	7212	7.4

Means followed by same letter do not significantly differ (P=.10, LSD)

Table 4. Soybean emergence, population, and grain yield when planted at 80,000 seeds per acre with and without seed treatment at three different planting dates at Rochester, MN in 2005.

Crop Code Part Rated Rating Date		Soybean Emerge 5/10/2005	Soybean Emerge 5/15/2005	Soybean Emerge 5/23/2005	Soybean Emerge 5/27/2005	Soybean Emerge 5/31/2005	Soybean Emerge 6/6/2005	Soybean Emerge 6/14/2005	Soybean Population 6/14/2005	Soybean Yield
Entry Name	**Planting Date**	**(Plants per 10" of row)**							**(Plants/A)**	**(Bu/A)**
NK Brand S19-R5	April 28	0.6 a	19 a	41 a	42 ab	43 a-d	42 abc	41 abc	70567 abc	44.5 a
NK Brand S19-R5 w/ ApronMax	April 28	0.1 ab	18 a	41 a	43 ab	43 ab	44 ab	44 a	75794 a	39.5 a
NK Brand S19-R5 w/ Cruiser Max	April 28	0.5 ab	18 a	43 a	44 a	44 a	45 a	44 a	76666 a	42.6 ab
NK Brand S19-R5	May 5	0	0	33 c	37 c	38 cd	38 c	38 c	66647 c	48.2 a
NK Brand S19-R5 w/ ApronMax	May 5	0	0	40 ab	42 ab	43 abc	43 ab	43 ab	75141 ab	48.4 a
NK Brand S19-R5 w/ Cruiser Max	May 5	0	0	37 b	40 bc	40 a-d	42 abc	41 abc	71438 abc	43.4 ab
NK Brand S19-R5	May 16			0	4 e	38 cd	38 c	39 bc	68607 bc	42.3 ab
NK Brand S19-R5 w/ ApronMax	May 16				7 de	39 bcd	40 bc	41 abc	72092 abc	43.2 ab
NK Brand S19-R5 w/ Cruiser Max	May 16				8 d	38 d	40 bc	40 abc	70132 abc	41.6 b
LSD (P=.10)		0.5	3	4	4	5	4	4	6958	6.2

Means followed by same letter do not significantly differ (P=.10, LSD)

Table 5. Grain yield and moisture of soybean planted with and without a seed treatment at three planting dates at Rochester, MN in 2005.

Crop Code **Part Rated** **Rating Data Type** **Harvest Date**				**Soybean GRAIN Moisture 10/4/2005**	**Soybean GRAIN Yield 10/04/2005**
Treatment	**Planting Date**	**Seeding Rate**	**Plant Stand**	**(%)**	**(bu/A)**
NK Brand S19-R5	April 28	80000	70567 abc	13.8 a	44.5 ab
NK Brand S19-R5 w/ ApronMax	April 28	80000	75794 a	13.3 c	39.5 b
NK Brand S19-R5 w/ Cruiser Max	April 28	80000	76666 a	13.7 ab	42.6 ab
NK Brand S19-R5	May 5	80000	66647 c	13.6 abc	48.2 a
NK Brand S19-R5 w/ ApronMax	May 5	80000	75141 ab	13.5 abc	48.4 a
NK Brand S19-R5 w/ Cruiser Max	May 5	80000	71438 abc	13.5 abc	43.4 ab
NK Brand S19-R5	May 16	80000	68607 bc	13.5 abc	42.3 ab
NK Brand S19-R5 w/ ApronMax	May 16	80000	72092 abc	13.4 bc	43.2 ab
NK Brand S19-R5 w/ Cruiser Max	May 16	80000	70132 abc	13.4 abc	41.6 b
LSD (P=.10)			6958	0.4	6.2

Means followed by same letter do not significantly differ (P=.10, LSD)

Table 6. Average number of soybean aphids per plant in soybean treated and untreated with a seed treatment at Rochester, MN in 2005.

Crop Code Part Rated Rating Date			Soybean Aphids 6/14/2005		Soybean Aphids 6/22/2005		Soybean Aphids 7/6/2005		Soybean Aphids 7/19/2005		Soybean Aphids 8/3/2005		Soybean Aphids 8/16/2005		Soybean Yield	
Treatment	Planting Date	Seeding rate	No. per plant		No. per plant		No. per plant		No. per plant		No. per plant		No. per plant		(bu/A)	
NK Brand S19-R5	April 28th	80000	12	ab	25	a	16	a	32	cd	279	a	114	abc	44.5	ab
NK Brand S19-R5 w/ ApronMax	April 28th	80000	9	abc	16	ab	7	ab	38	bcd	206	ab	93	bc	39.5	b
NK Brand S19-R5 w/ Cruiser Max	April 28th	80000	0	d	3	cde	5	ab	33	cd	130	b	73	c	42.6	ab
NK Brand S19-R5	May 5th	80000	8	bc	12	bc	12	ab	58	abc	278	a	161	a	48.2	a
NK Brand S19-R5 w/ ApronMax	May 5th	80000	15	a	12	bc	12	ab	67	ab	187	ab	141	ab	48.4	a
NK Brand S19-R5 w/ Cruiser Max	May 5th	80000	0	d	1	de	3	b	30	cd	158	ab	123	abc	43.4	ab
NK Brand S19-R5	May 16th	80000	5	cd	10	bcd	11	ab	66	ab	259	a	144	ab	42.3	ab
NK Brand S19-R5 w/ ApronMax	May 16th	80000	7	bc	13	b	6	ab	78	a	264	a	127	abc	43.2	ab
NK Brand S19-R5 w/ Cruiser Max	May 16th	80000	0	d	0	e	4	ab	21	d	163	ab	101	bc	41.6	b
LSD (P=.10)			6		9		13		29		124		55		6.2	

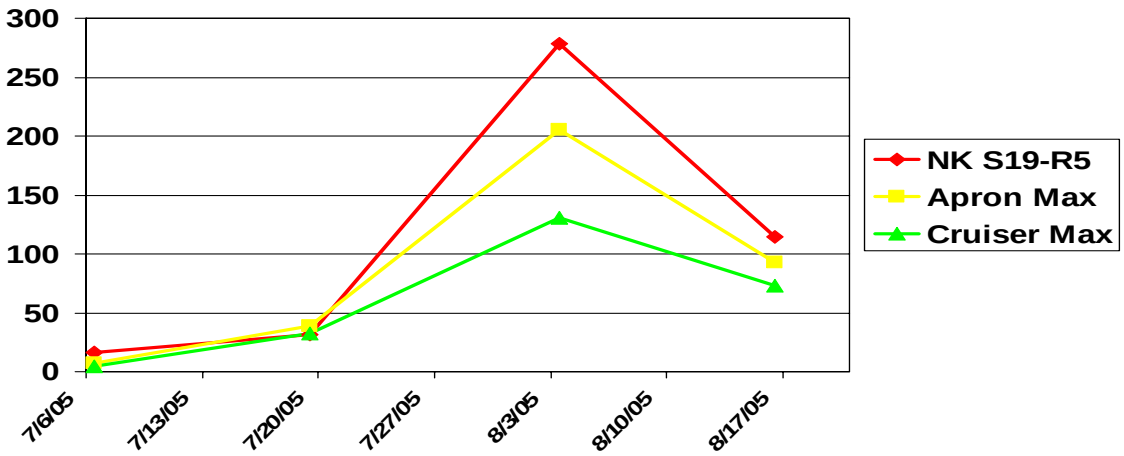
Means followed by same letter do not significantly differ (P=.10, LSD)

Table 7. Percent of plants infested with soybean aphids in soybean treated and untreated with a seed treatment at Rochester, MN in 2005.

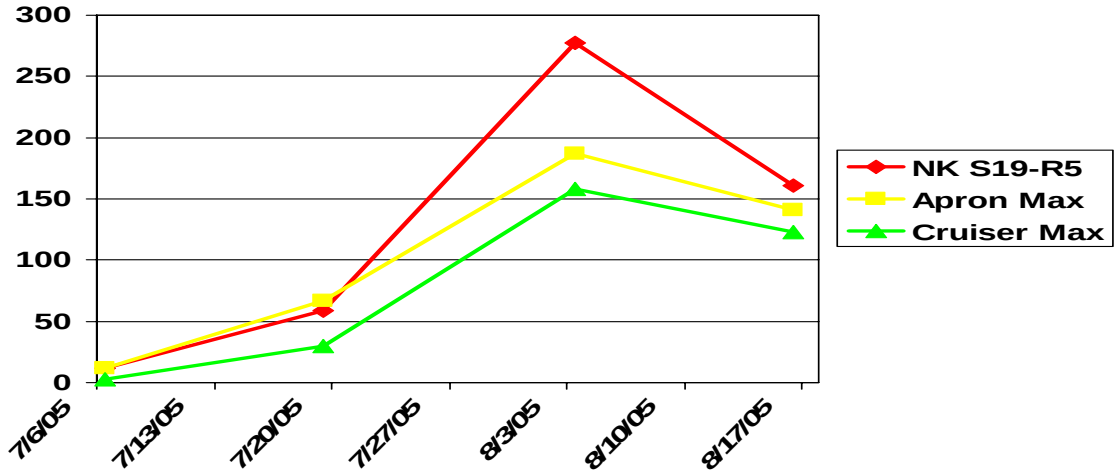
Crop Code Part Rated Rating Date			Soybean Plants infested 6/14/2005		Soybean Plants infested 6/22/2005		Soybean Plants infested 6/29/2005		Soybean Plants infested 7/6/2005		Soybean Plants infested 7/19/2005		Soybean Plants infested 8/3/2005		Soybean Plants infested 8/16/2005		Soybean Yield	
Treatment	**Planting Date**	**Seeding Rate**	**(%)**		**(%)**		**(%)**		**(%)**		**(%)**		**(%)**		**(%)**		**(bu/A)**	
NK Brand S19-R5	April 28th	80000	27	ab	58	a	73	a	85	a	95	a	100	a	100	a	44.5	ab
NK Brand S19-R5 w/ ApronMax	April 28th	80000	20	bc	28	b	76	a	60	a	100	a	100	a	100	a	39.5	b
NK Brand S19-R5 w/ Cruiser Max	April 28th	80000	1	d	7	cd	44	bc	45	a	95	a	100	a	100	a	42.6	ab
NK Brand S19-R5	May 5th	80000	19	bc	42	ab	67	a	85	a	100	a	100	a	100	a	48.2	a
NK Brand S19-R5 w/ ApronMax	May 5th	80000	33	a	28	b	65	ab	90	a	100	a	100	a	100	a	48.4	a
NK Brand S19-R5 w/ Cruiser Max	May 5th	80000	1	d	2	d	30	cd	60	a	100	a	100	a	100	a	43.4	ab
NK Brand S19-R5	May 16th	80000	12	cd	24	bc	74	a	60	a	100	a	100	a	100	a	42.3	ab
NK Brand S19-R5 w/ ApronMax	May 16th	80000	19	bc	38	ab	71	a	70	a	100	a	100	a	100	a	43.2	ab
NK Brand S19-R5 w/ Cruiser Max	May 16th	80000	0	d	1	d	11	d	60	a	100	a	100	a	100	a	41.6	b
LSD (P=.10)			13		20		22		46		5		0		0		6.2	

Means followed by same letter do not significantly differ (P=.10, LSD)

Soybean Aphid and Seed Treatments 2005
April 28 Planting Date



Soybean Aphid and Seed Treatments 2005
May 5 Planting Date



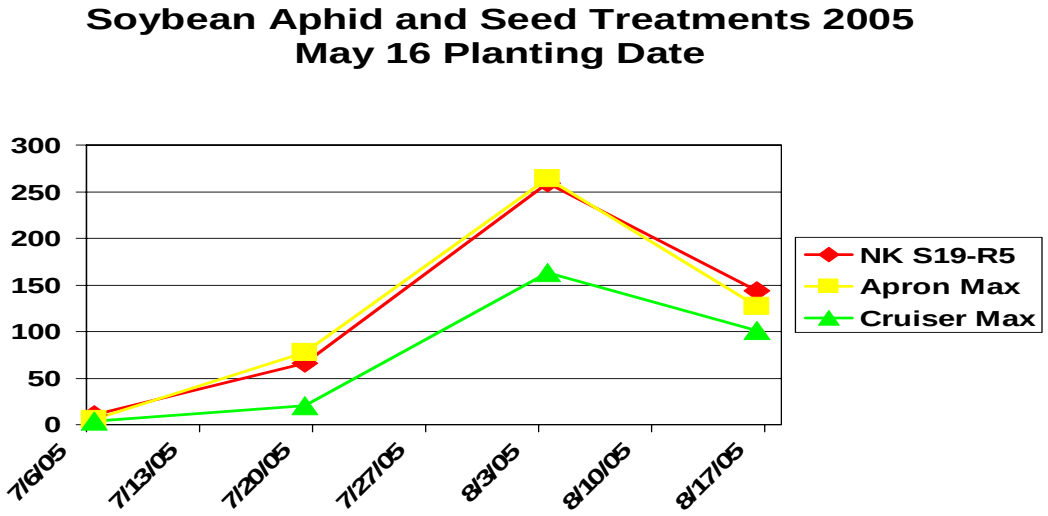


Table 8. Average number of bean leaf beetles per plant in soybean treated and untreated with a seed treatment at Rochester, MN in 2005.

Crop Code Part Rated Rating Date			Soybean Bean leaf beetle 6/3/2005		Soybean Bean leaf beetle 6/14/2005		Soybean Bean leaf beetle 6/22/2005		Soybean Bean leaf beetle 6/29/2005	
Treatment	Seeding Rate	Planting Date	per 10 feet of row		per 10 feet of row		per 10 feet of row		per 10 feet of row	
NK Brand S19-R5	80000	April 28	0.3	bc	0.3	b	0.0	b	0.0	b
NK Brand S19-R5 w/ ApronMax	80000	April 28	0.3	bc	1.8	a	0.0	b	0.3	b
NK Brand S19-R5 w/ Cruiser Max	80000	April 28	0.0	c	0.3	b	0.3	ab	0.8	a
NK Brand S19-R5	80000	May 5	0.8	ab	0.8	ab	0.5	a	0.0	b
NK Brand S19-R5 w/ ApronMax	80000	May 5	1.0	a	0.5	b	0.5	a	0.0	b
NK Brand S19-R5 w/ Cruiser Max	80000	May 5	0.0	c	0.0	b	0.3	ab	0.0	b
NK Brand S19-R5	80000	May 16	0.3	bc	0.8	ab	0.3	ab	0.0	b
NK Brand S19-R5 w/ ApronMax	80000	May 16	0.0	c	0.8	ab	0.5	a	0.0	b
NK Brand S19-R5 w/ Cruiser Max	80000	May 16	0.0	c	0.0	b	0.0	b	0.0	b
LSD (P=.10)			0.6		1.2		0.5		0.4	

Means followed by same letter do not significantly differ (P=.10, LSD)

Table 9. Soybean yield and moisture content for soybean treated with Cruiser Max and planted at three different dates and five seeding rates at Rochester, MN in 2005.

Crop Code Rating Data Type Treatment	Planting Date	Seeding Rate	Population/A		Soybean Moisture (%)		Soybean Yield (bu/A)	
NK Brand S19-R5 w/ Cruiser Max	April 28	80000	76,666	fg	13.7	a	42.6	abc
NK Brand S19-R5 w/ Cruiser Max	April 28	100000	96,485	e	13.4	ab	44.0	abc
NK Brand S19-R5 w/ Cruiser Max	April 28	120000	112,167	cd	13.6	ab	42.4	abc
NK Brand S19-R5 w/ Cruiser Max	April 28	140000	131,987	b	13.3	b	39.2	c
NK Brand S19-R5 w/ Cruiser Max	April 28	160000	143,095	a	13.3	ab	39.8	bc
NK Brand S19-R5 w/ Cruiser Max	May 5	80000	71,438	g	13.5	ab	43.4	abc
NK Brand S19-R5 w/ Cruiser Max	May 5	100000	96,485	e	13.4	ab	45.7	a
NK Brand S19-R5 w/ Cruiser Max	May 5	120000	108,464	b	13.5	ab	44.0	abc
NK Brand S19-R5 w/ Cruiser Max	May 5	140000	125,671	b	13.4	ab	43.5	abc
NK Brand S19-R5 w/ Cruiser Max	May 5	160000	147,015	a	13.4	ab	44.4	abc
NK Brand S19-R5 w/ Cruiser Max	May 16	80000	70,132	g	13.4	ab	41.6	abc
NK Brand S19-R5 w/ Cruiser Max	May 16	100000	83,417	f	13.5	ab	44.9	abc
NK Brand S19-R5 w/ Cruiser Max	May 16	120000	105,415	d	13.5	ab	45.4	ab
NK Brand S19-R5 w/ Cruiser Max	May 16	140000	116,959	c	13.4	ab	44.6	abc
NK Brand S19-R5 w/ Cruiser Max	May 16	160000	133,076	b	13.5	ab	47.0	a
LSD (P=.10)			8329		0.4		5.8	

Means followed by same letter do not significantly differ (P=.10, LSD)

2003,2004 & 2005 Combined IPM Assessment

2004 & 2005 ~ 850 responses

2003, 2004 & 2005 ~ 1,000 responses

Fritz Breitenbach, IPM Specialist
Lisa M. Behnken, Regional Extension Educator
Ryan Miller, Regional Extension Educator
Liz Stahl, Regional Extension Educator
Dave Pfarr, Blue Earth / LeSueur County Extension Educator
Brad Carlson, Rice / Steele County Extension Educator
Jerry Tesmer, Fillmore / Winona / Houston Technical Advisor
University of Minnesota Extension Service

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

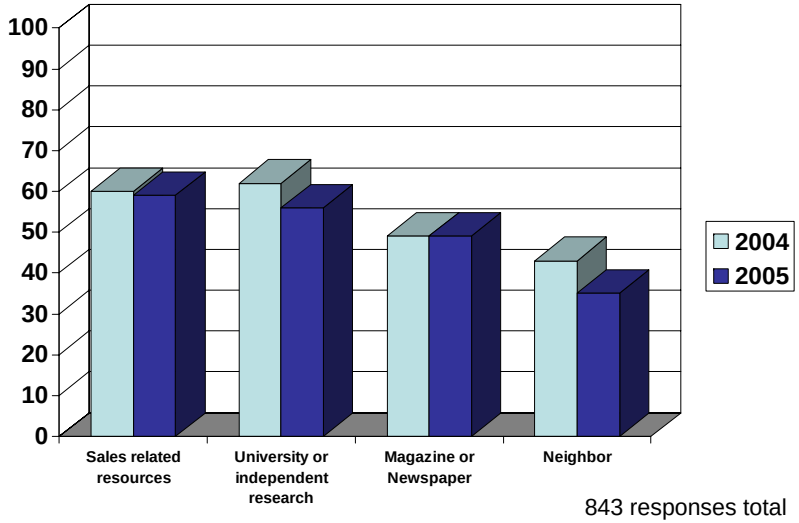
The **National Integrated Pest Management (IPM) Initiative** was announced in 1994 with the intent to achieve a national goal of IPM implementation of 75% of crop acres by 2000. For the most part, this goal has been met on high value crops, but not on commodity crops such as corn and soybeans. Creating awareness and interest in IPM practices and Relating them directly to the farm can help promote and increase adoption.

The "Pest Management Assessment was developed to help farmers take credit for IPM practices that they currently use and to provide an awareness of other IPM practices they may wish to consider. Information gained from the assessment also helps educators develop programs that assist farmers with implementing IPM practices on their farms.

The assessment consists of questions in four categories: general, weed, insect, and disease management. The following slides show the response results from approximately 1000 Private Pesticide Applicators who completed the assessment during the 2003, 3004 and 2005 Private Pesticide Applicator Safety Training Workshops held throughout Southern Minnesota.

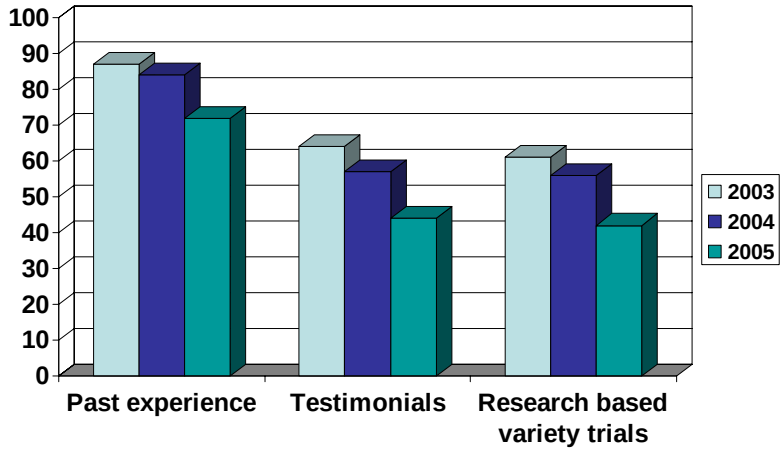
Section 1
General Management

What sources of information do you regularly use for pest management information? Top 4 answers.

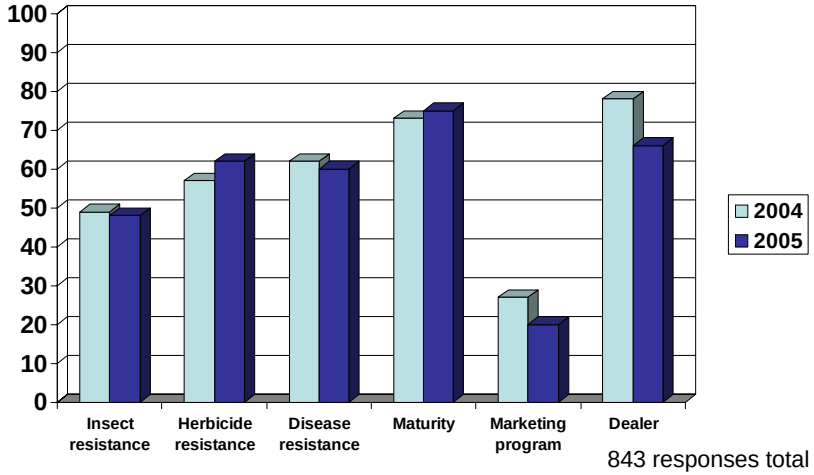


843 responses total

What sources of information do you value most when selecting varieties for your farm? Top 3 answers.

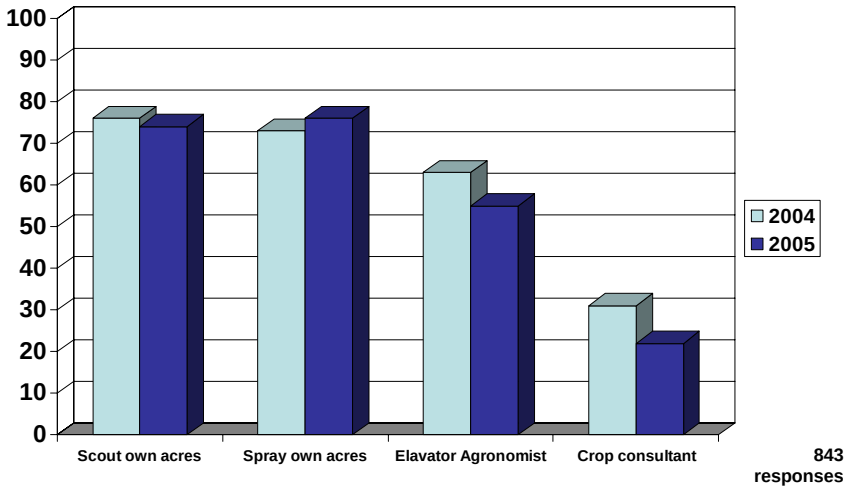


What other factor or traits do you consider when selecting varieties for your farm?



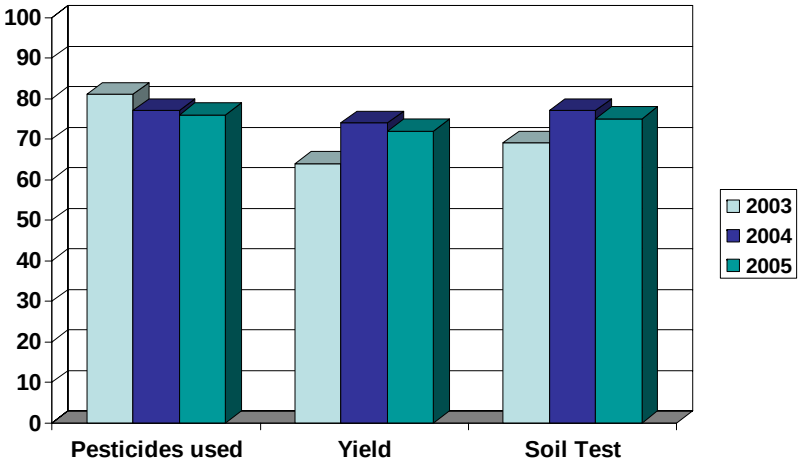
843 responses total

Which one of the following practices do you utilize on your farm?

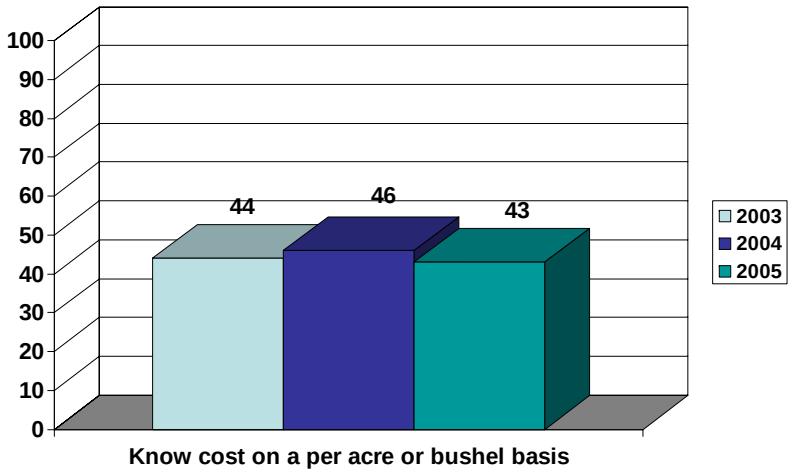


843 responses

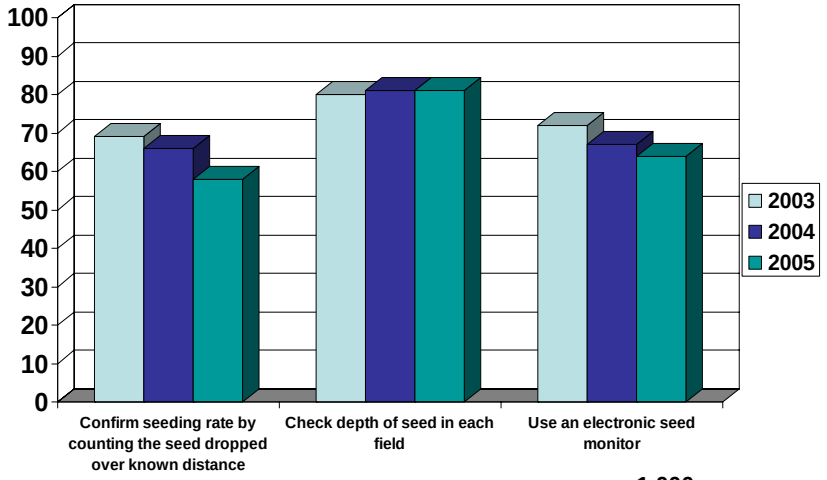
What records do you regularly keep for individual farm fields?



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

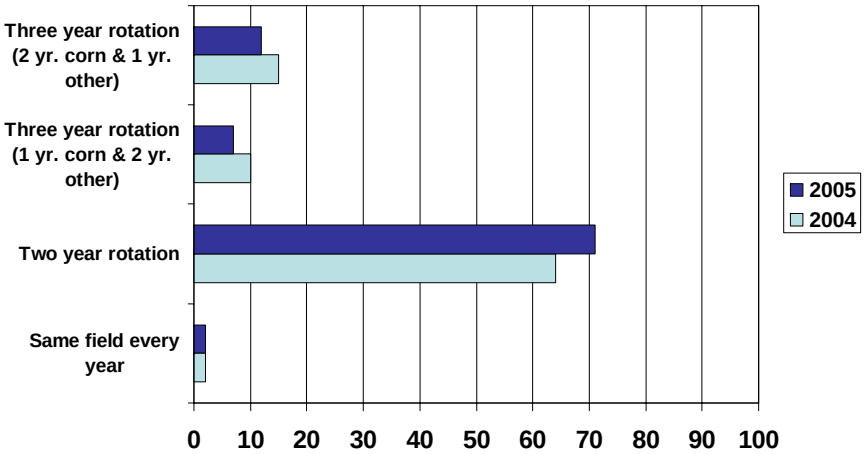


When calibrating and adjusting your corn planter do you:

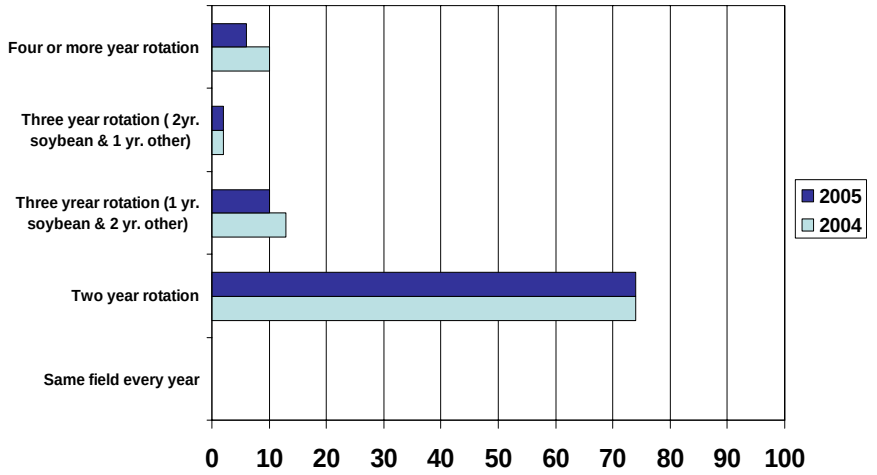


1,000 responses

You generally plant corn:

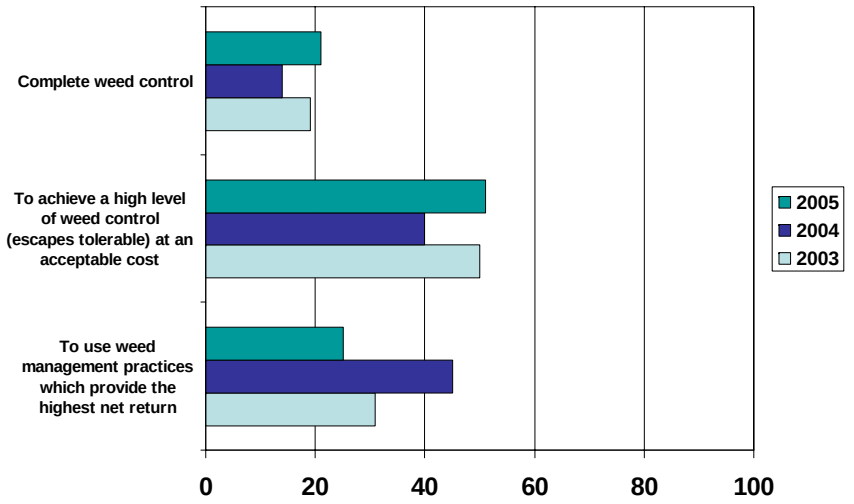


You generally plant soybeans:

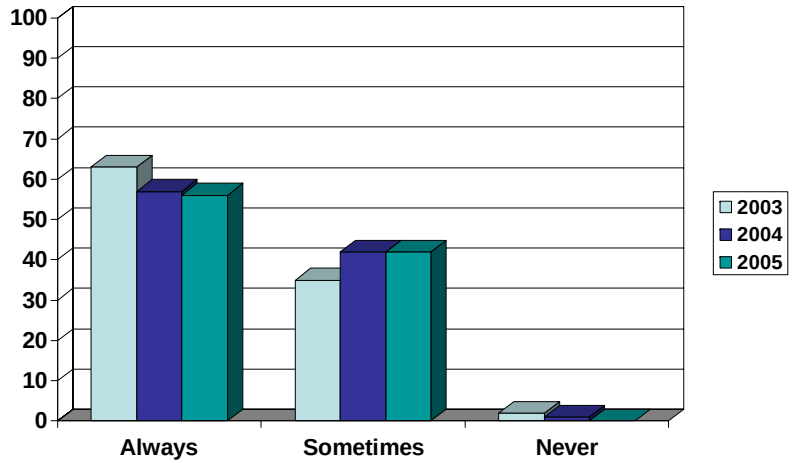


Section 2
Weed Management

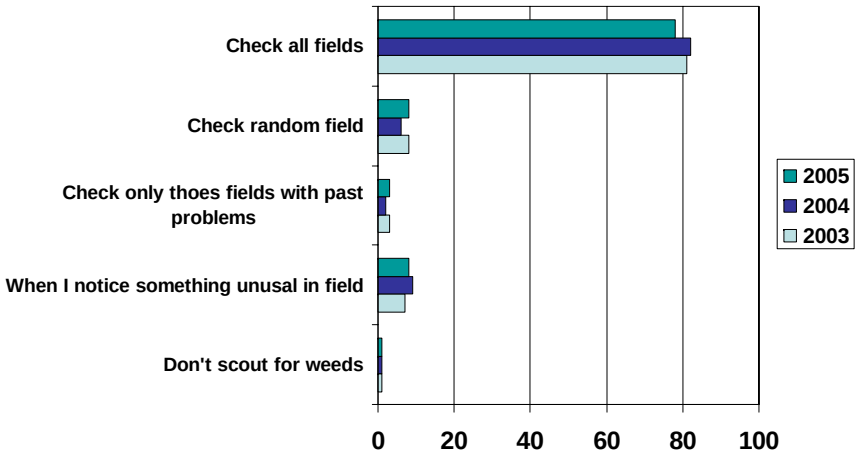
Which statement best describes your weed management philosophy?



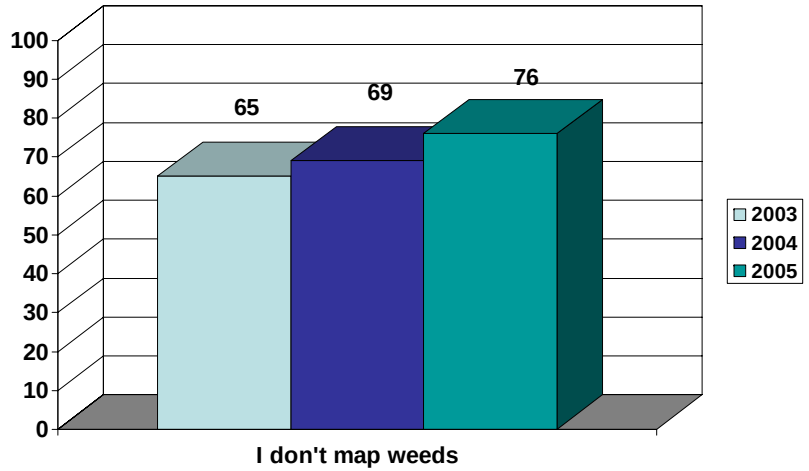
How confident are you that weeds on your farm have been properly identified?



How do you scout for weeds?

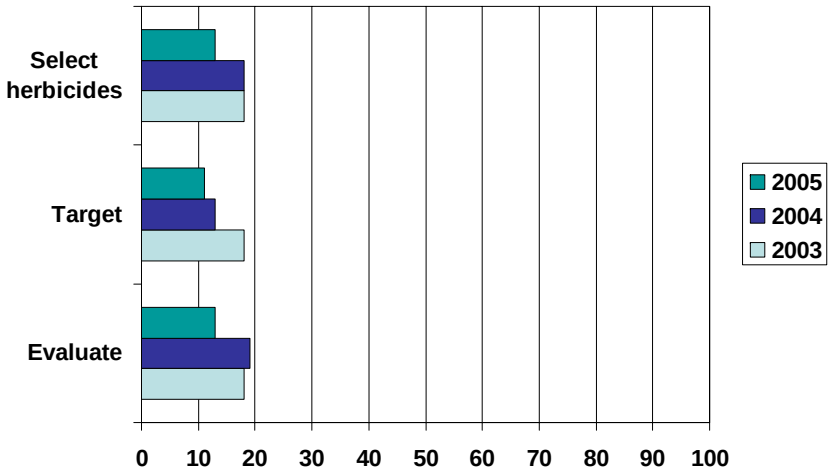


How detailed are your weed maps?

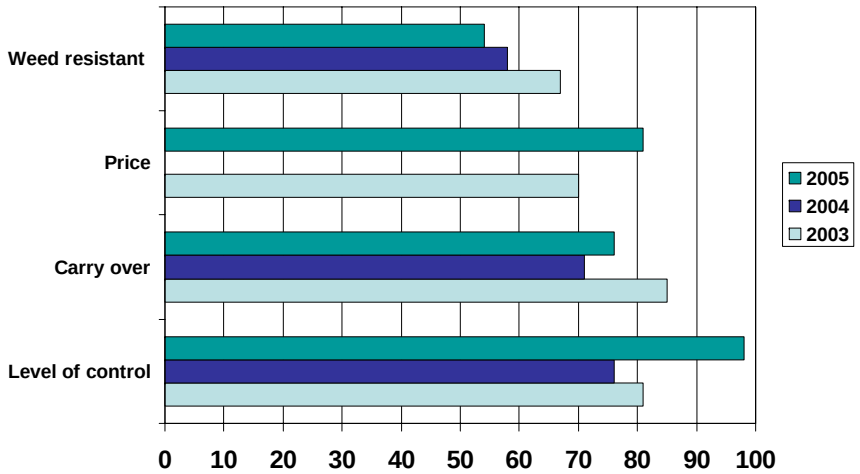


997 responses total

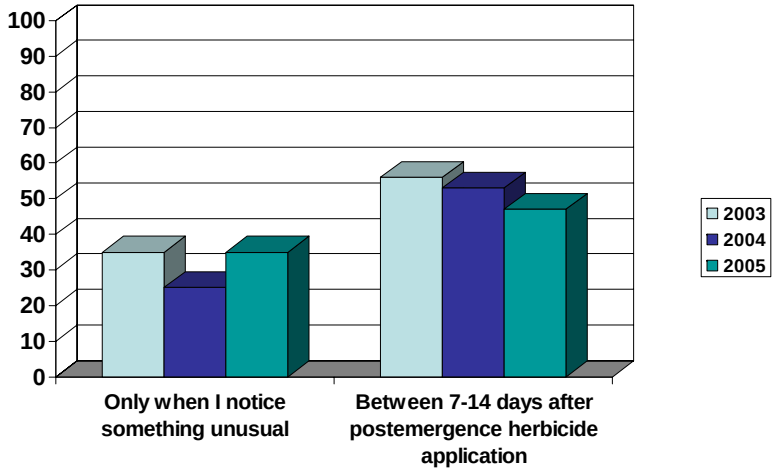
How I use maps weed maps



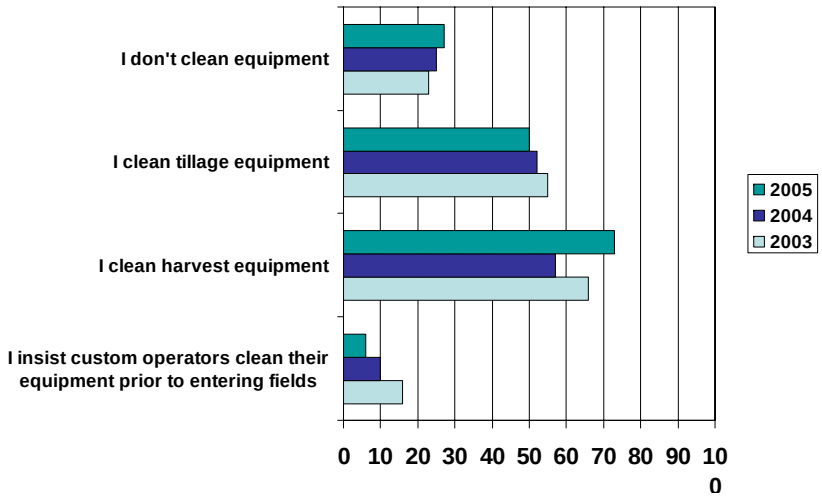
Which of the following do you actually consider when selecting herbicides?



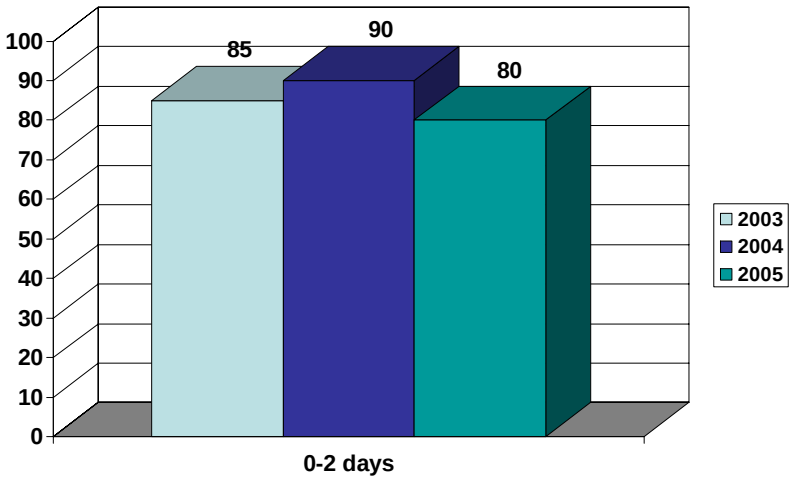
Do you scout fields for weed escapes to determine if additional control measures are necessary?



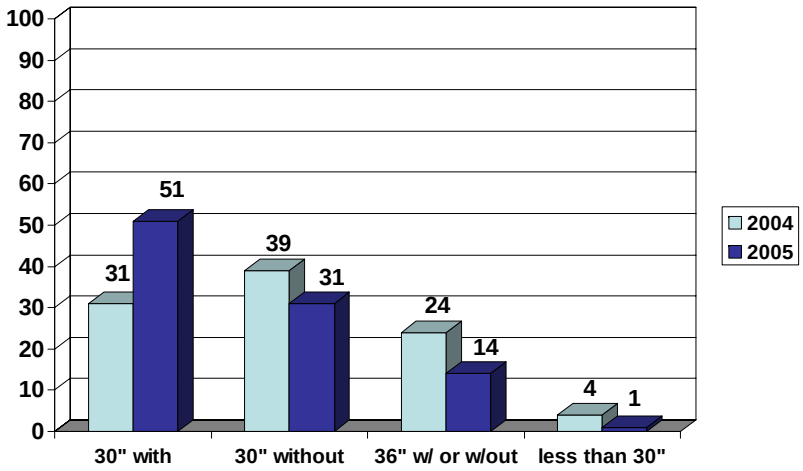
Which of the following measures do you use to prevent the spread of new weed species?



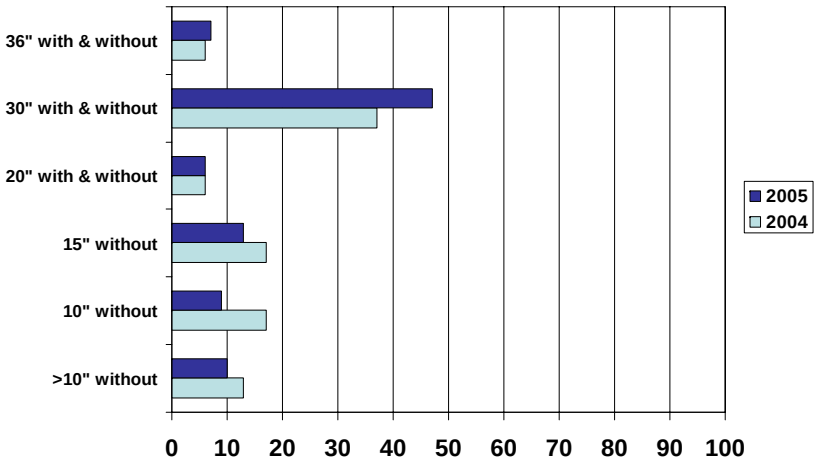
In general, how much time passes between final seedbed preparation and planting?



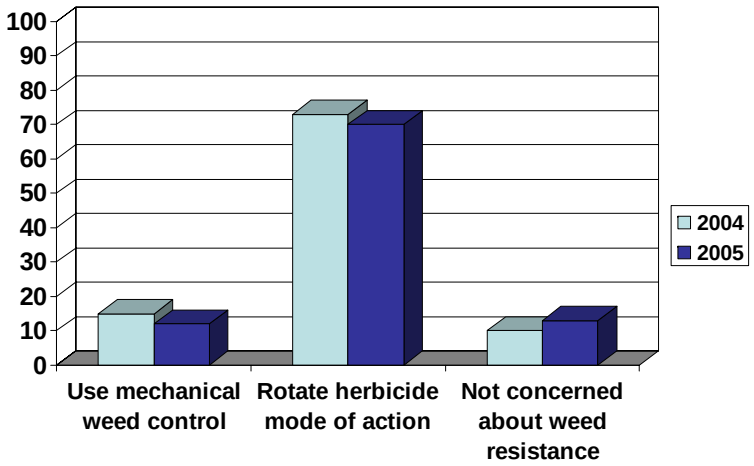
What is your corn row spacing and cultivation?



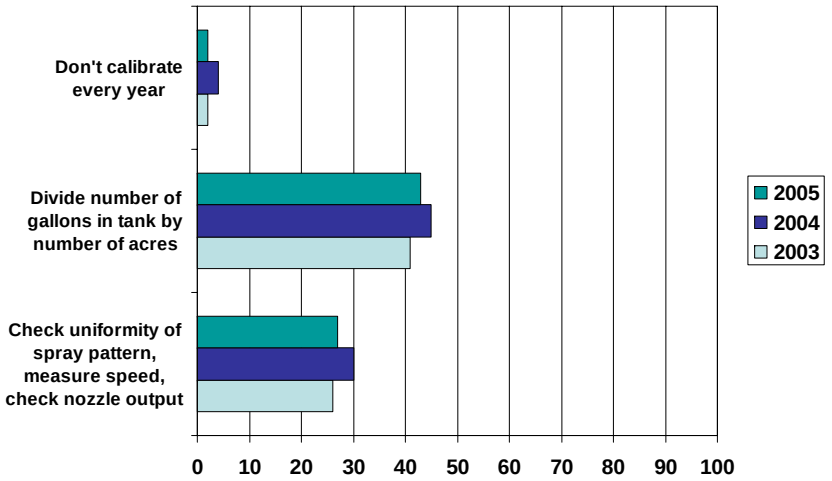
What is your soybean row spacing and cultivation?



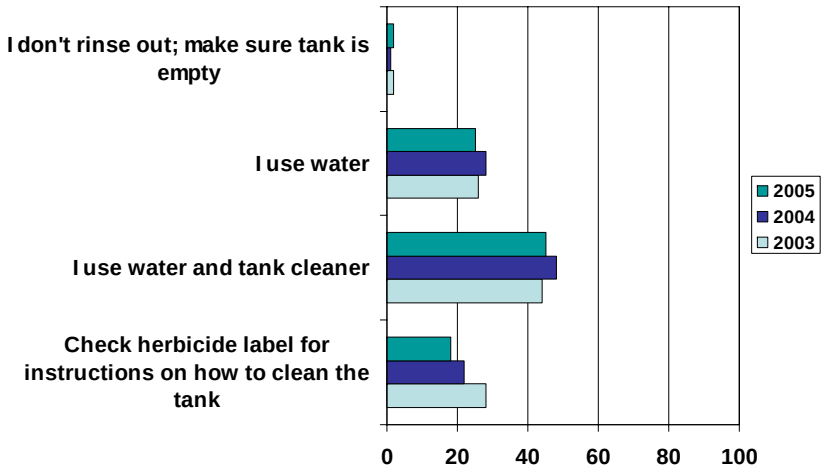
How do you manage weed resistance?



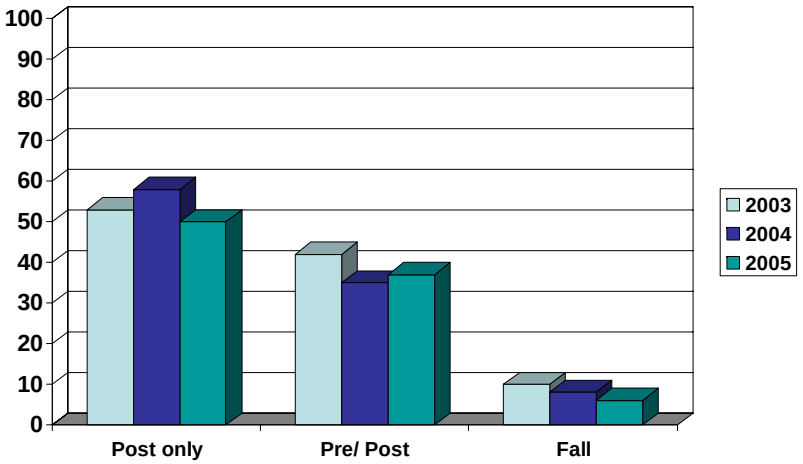
Which method best describes how you calibrate your field sprayer?



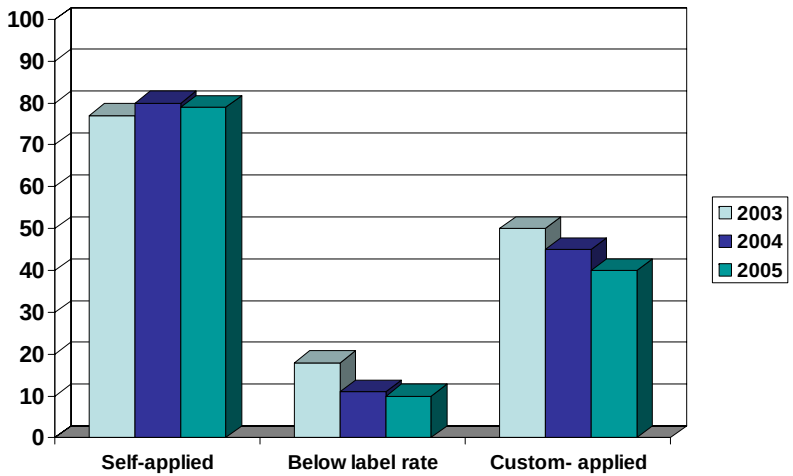
When changing from one crop to another, which method best describes how you clean the spray tank?



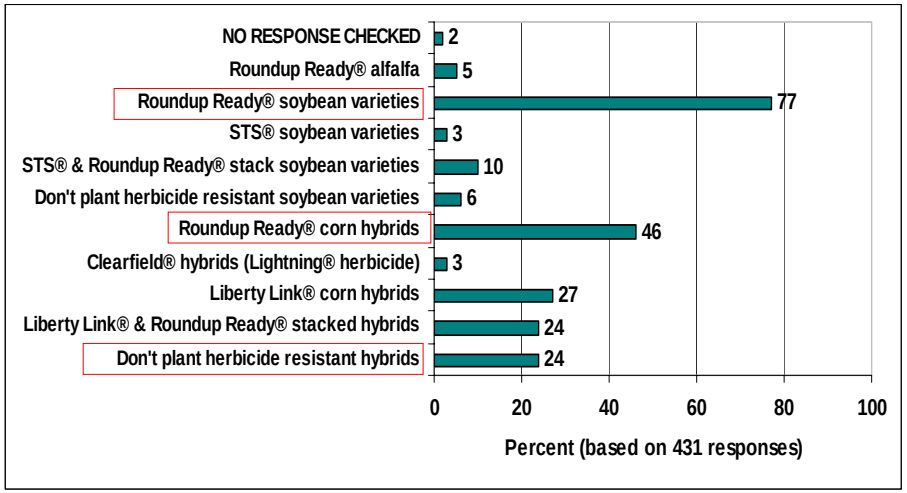
Which herbicide application timing(s) do you currently use?



Which method of herbicide application do you generally use?

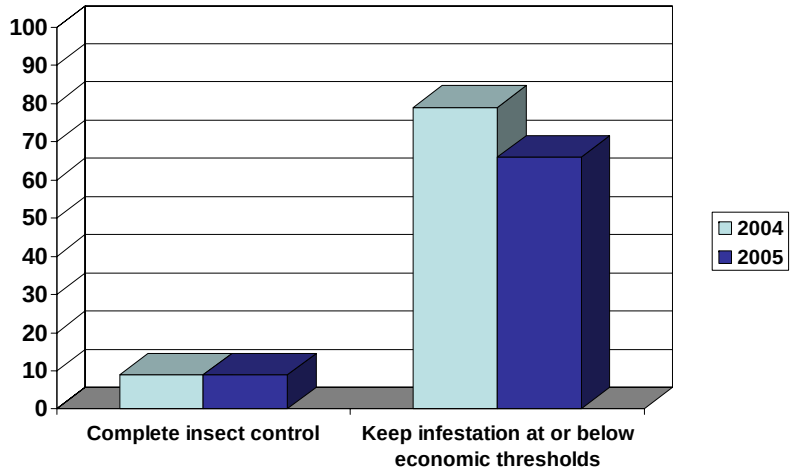


Do you plant herbicide resistant crops? (2005 Results)

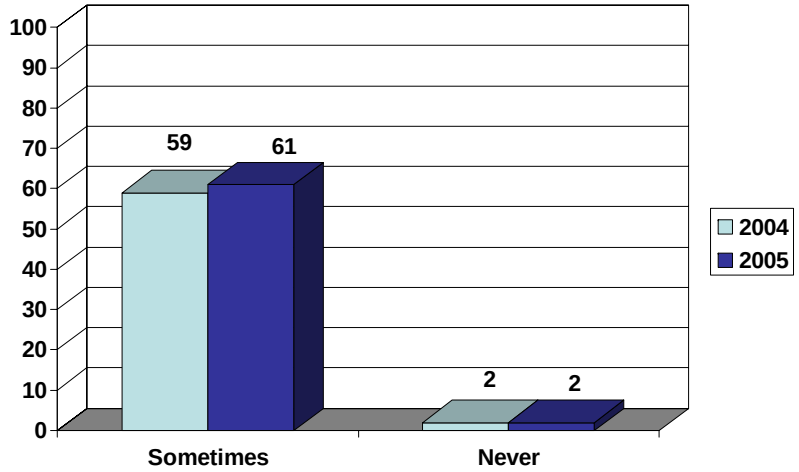


Section 3
Insect Management

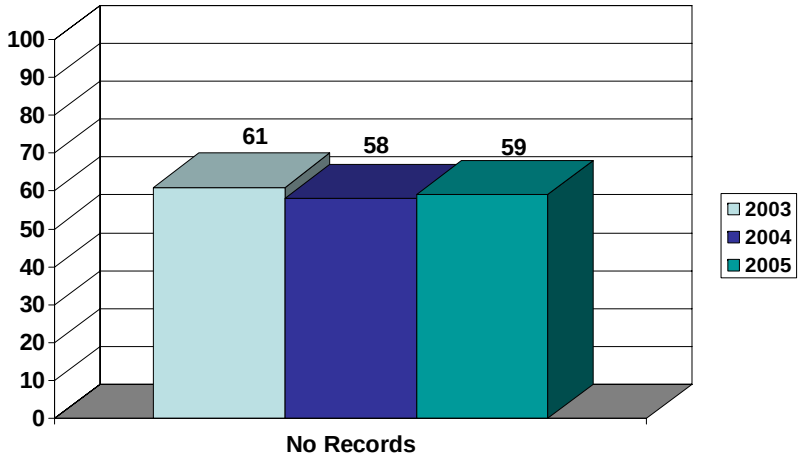
Which statement best describes your insect management philosophy?



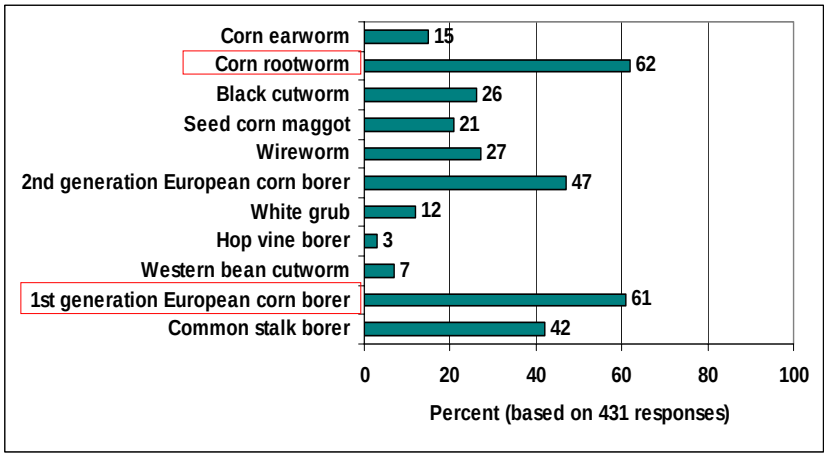
How confident are you that insect pest on your farm have been properly identified?



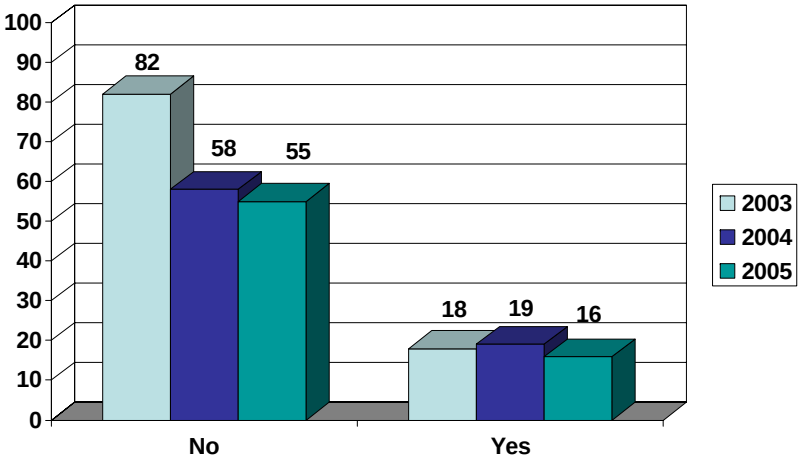
How detailed are you insect pest records?



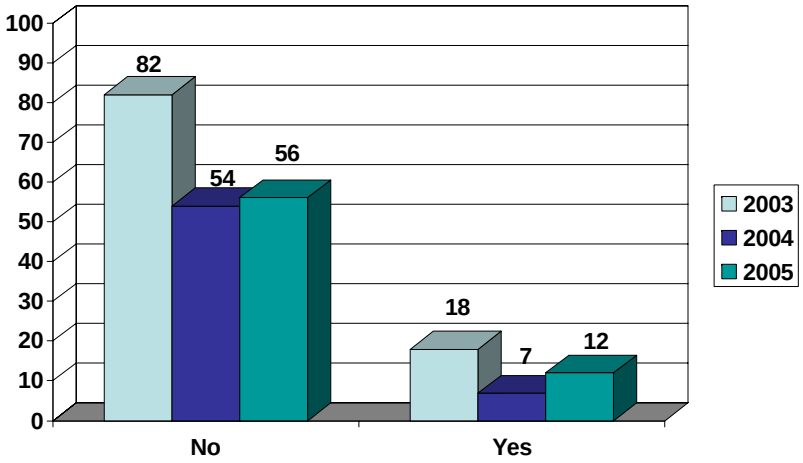
Which corn insects do you regularly scout for? (2005 Results)



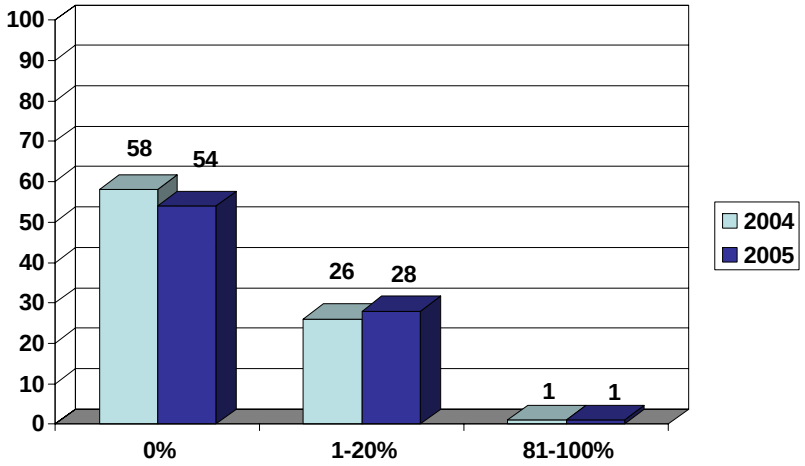
Do you have problems with <u>northern</u> corn rootworms in corn following soybeans?



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

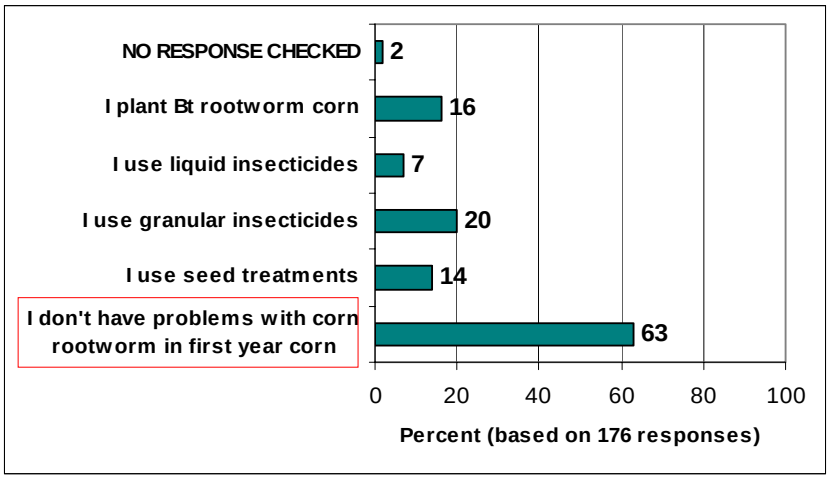


What percentage of your acreage do you plant to Bt rootworm hybrids?



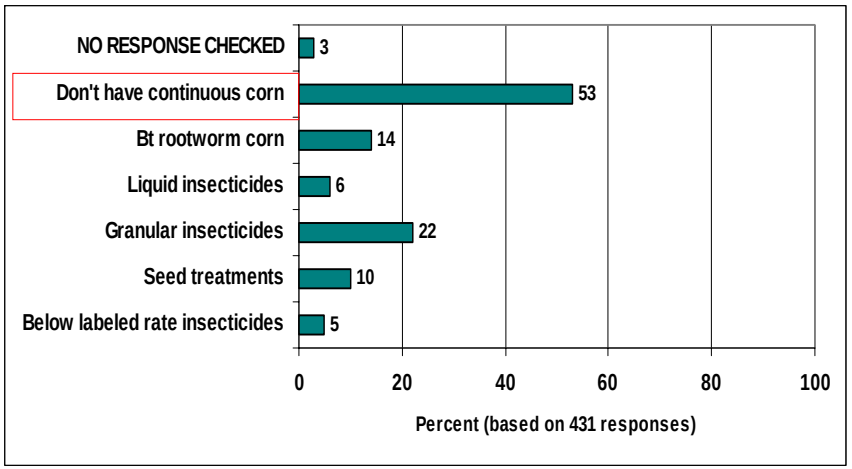
How do you manage corn rootworms in first year corn?

(2005 Results)

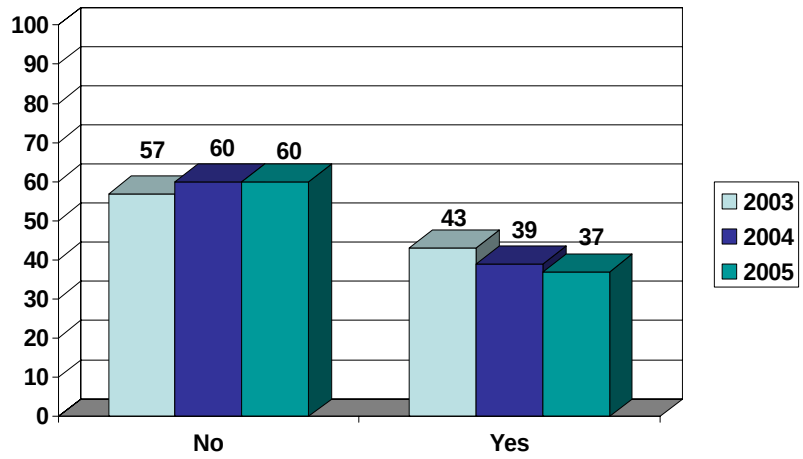


On continuous corn with light to moderate population of corn rootworms, do you use:

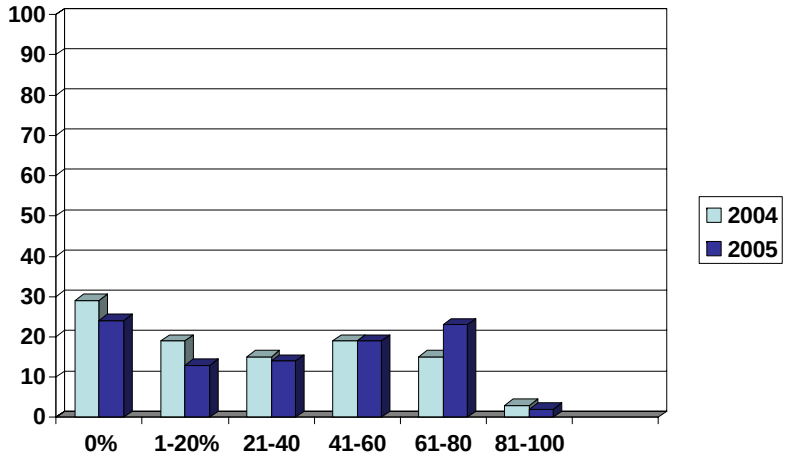
(2005 Results)



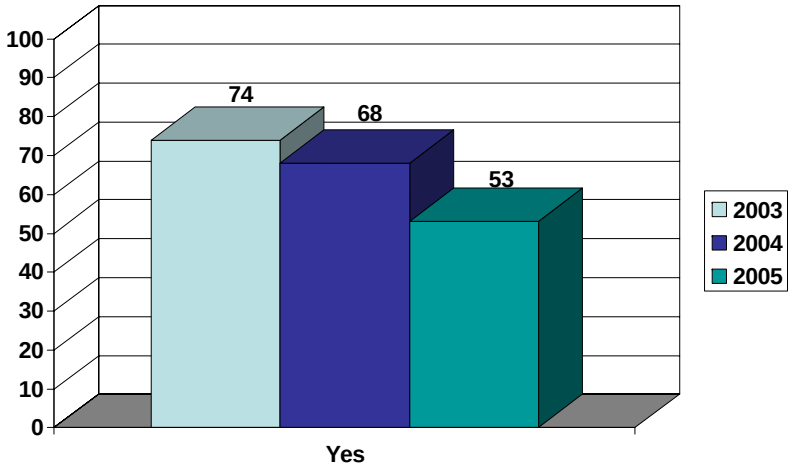
Do you use European corn borer scouting information to schedule harvest?



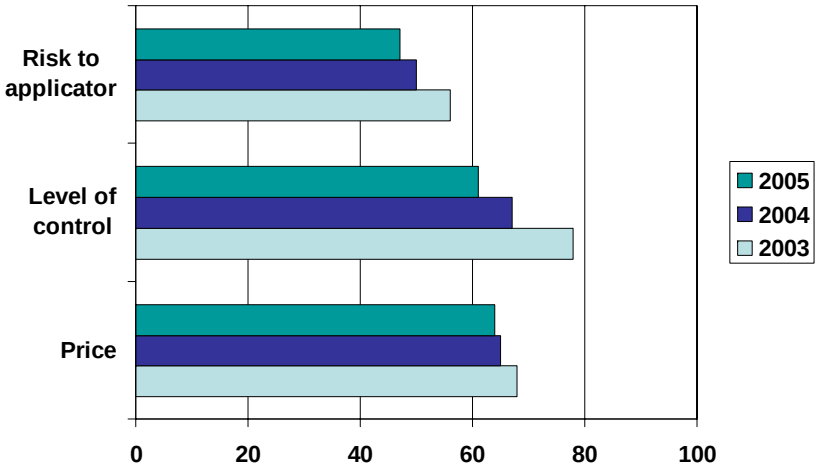
What percentage of your acreage do you plant to Bt corn borer hybrids?



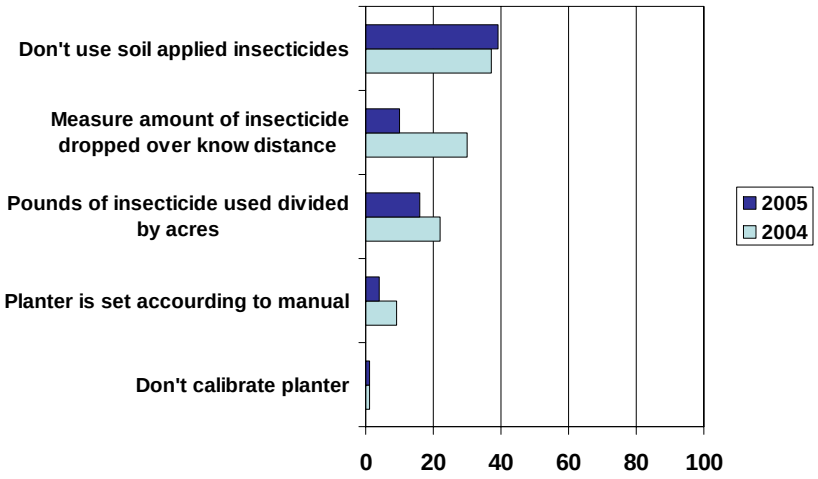
Do you consider the benefits of weed control on reducing insect pest infestations?



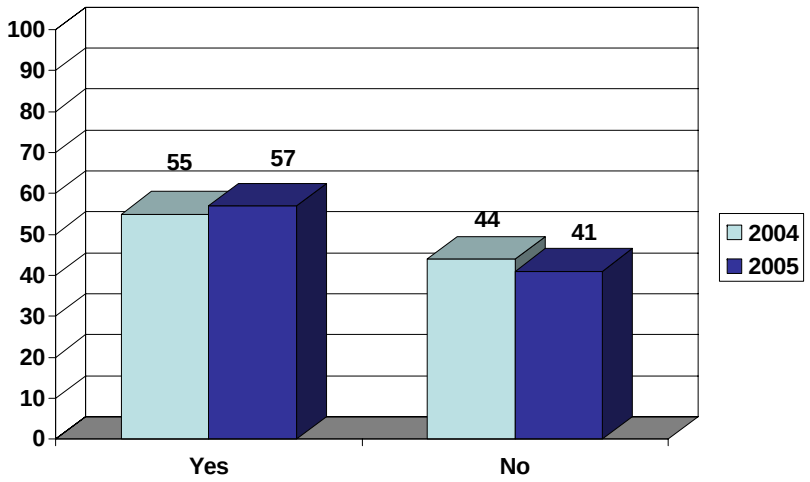
Which of the following do you actually consider when selecting a corn insecticide?



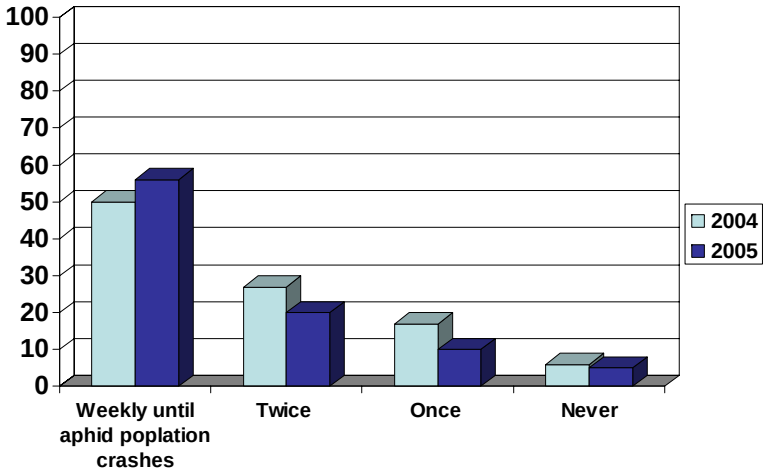
Which calibration method for soil applied insecticide do you use?



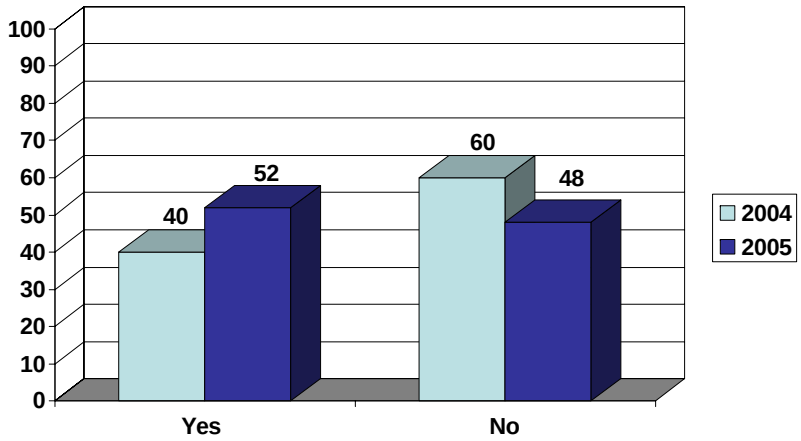
Have you sprayed soybeans to control soybean aphid?



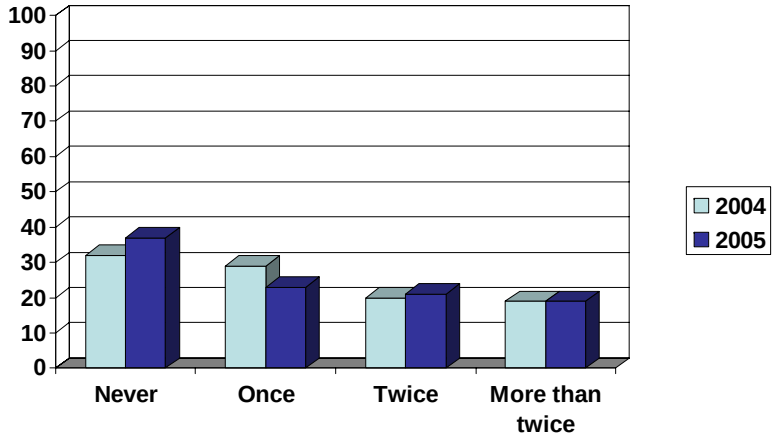
How often are your soybeans fields scouted for soybean aphids?



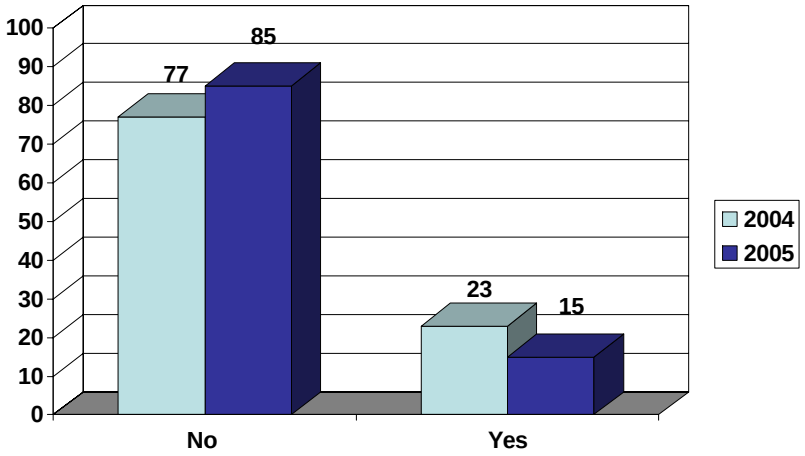
Have you sprayed alfalfa to control potato leafhopper?



How often per cutting are your alfalfa fields scouted for potato leafhopper?

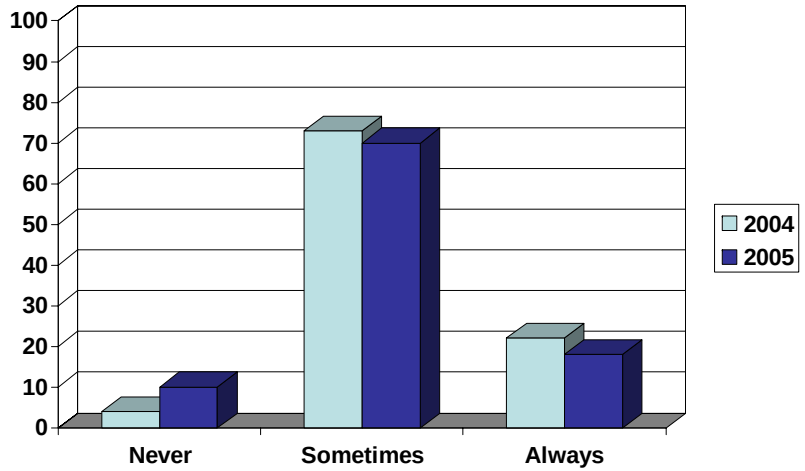


Do you use potato leafhopper resistant alfalfa varieties on your farm?

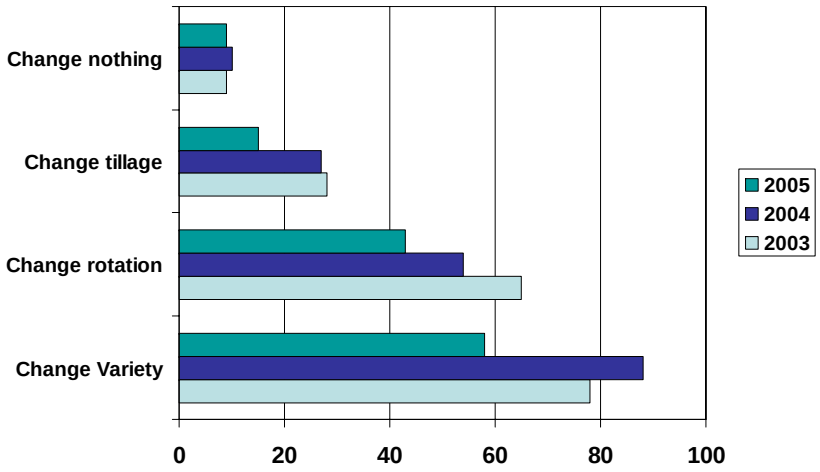


Section 4
Disease Management

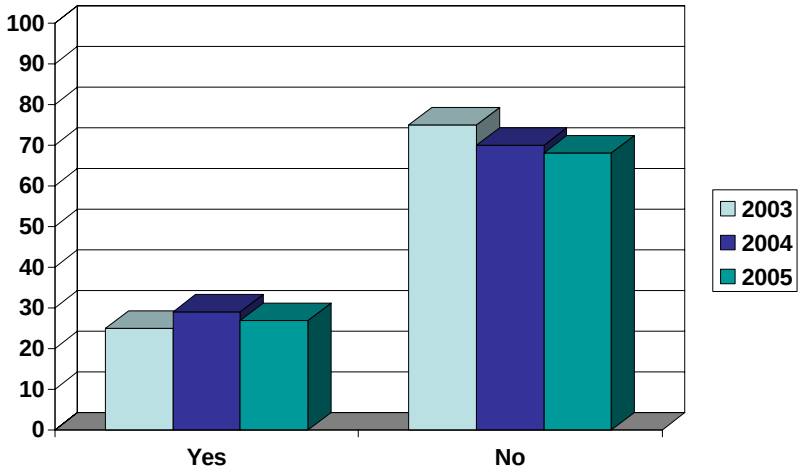
How confident are you that plant diseases on your farm have been properly identified?



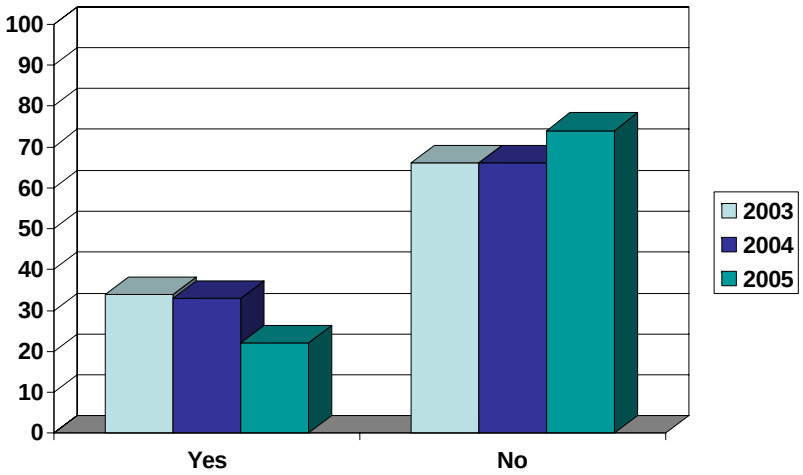
Based on the incidence of plant disease in the pervious year, do you:



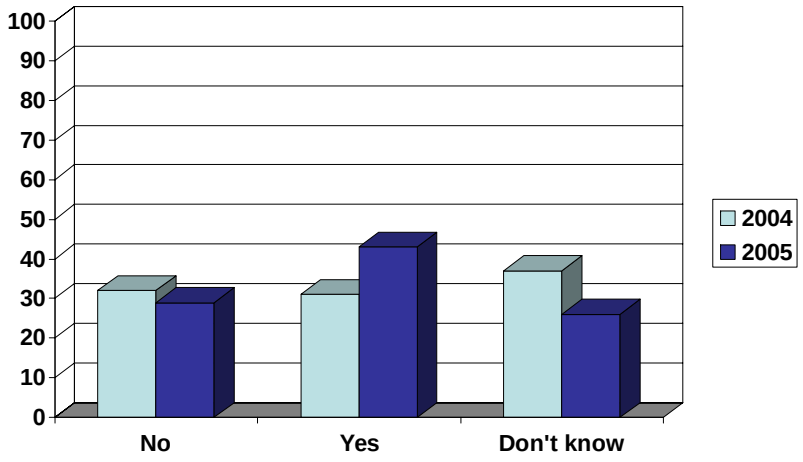
Do you request a specific seed treatment for seedling disease protection?



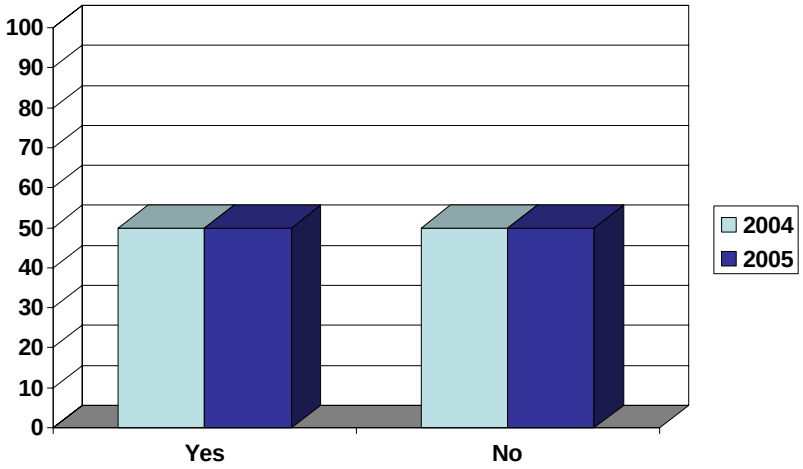
Do you use corn leaf health to predict stalk rot problems?



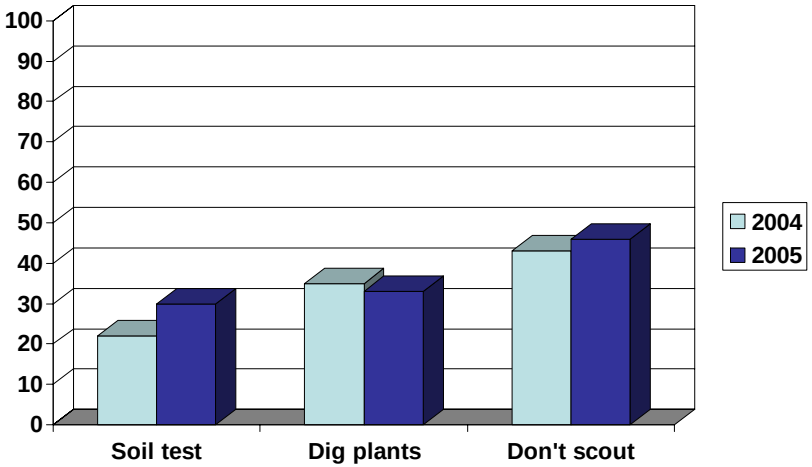
Do you have Soybean Cyst Nematodes (SCN) on your farm?



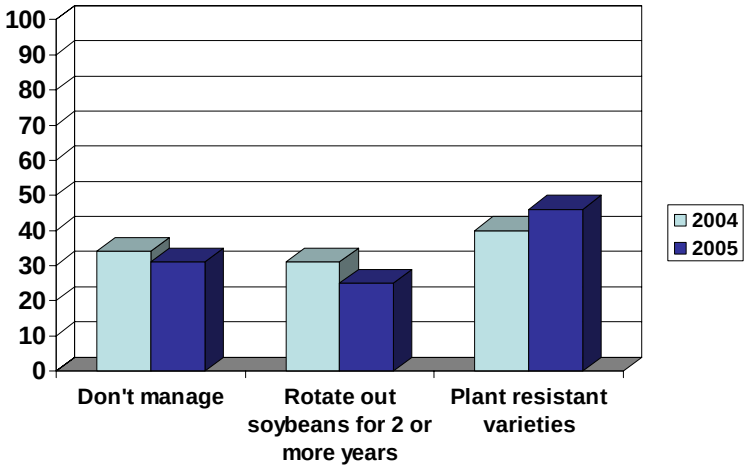
Have you scouted for SCN on your farm?



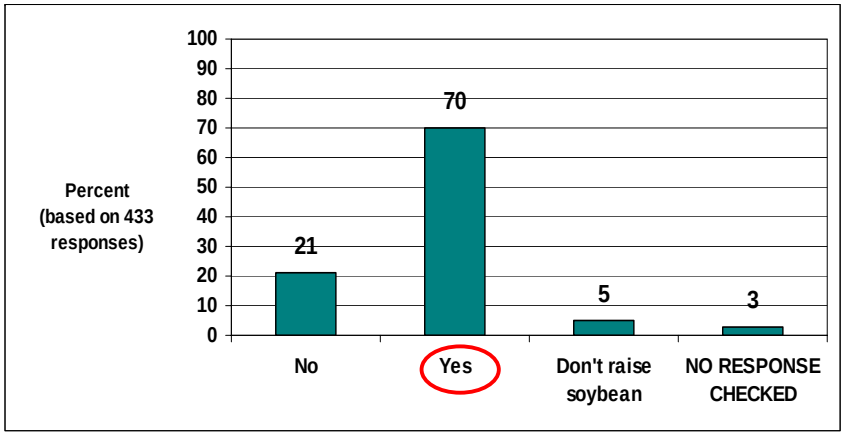
How do you scout for SCN?



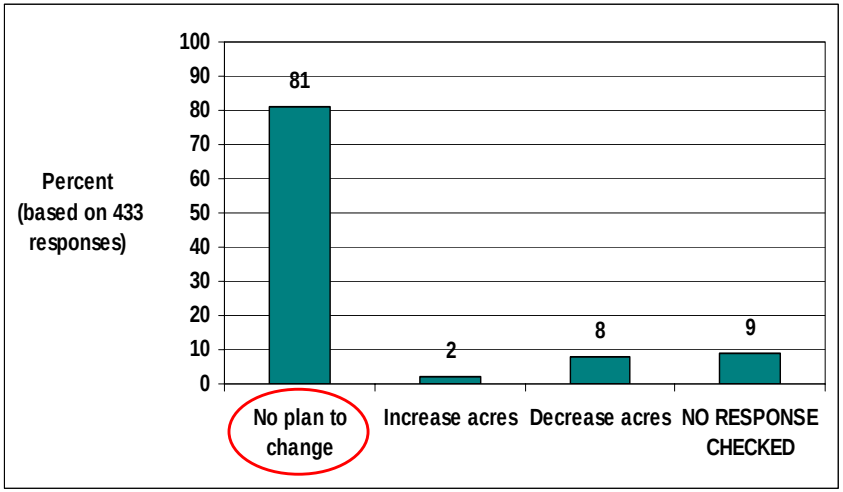
How do you manage SCN?



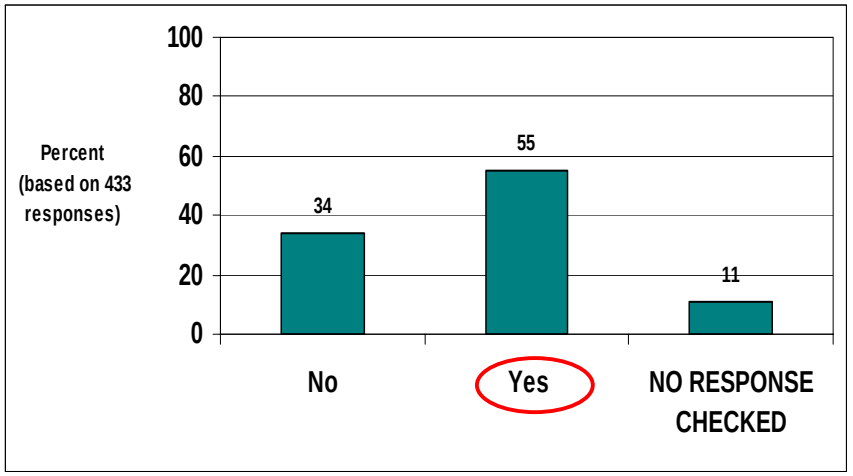
Are you concerned about soybean rust in 2005?



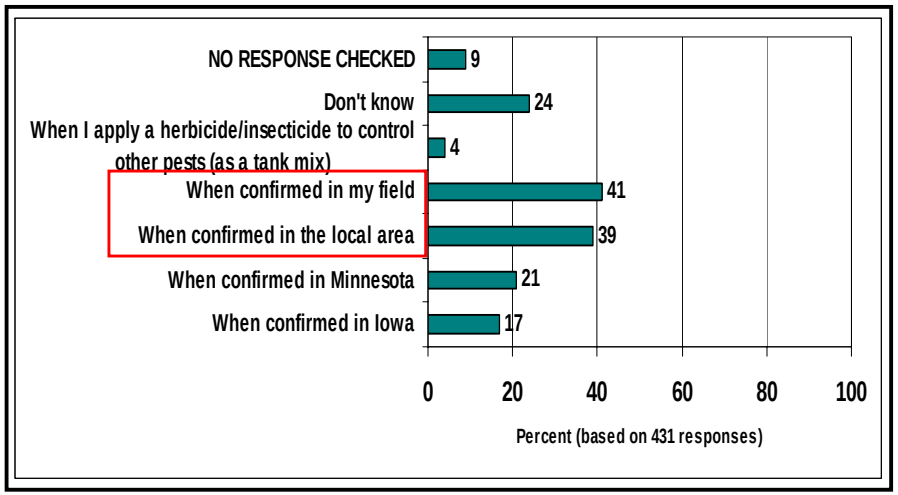
In 2005, will you change soybean acreage due to the threat of soybean rust?



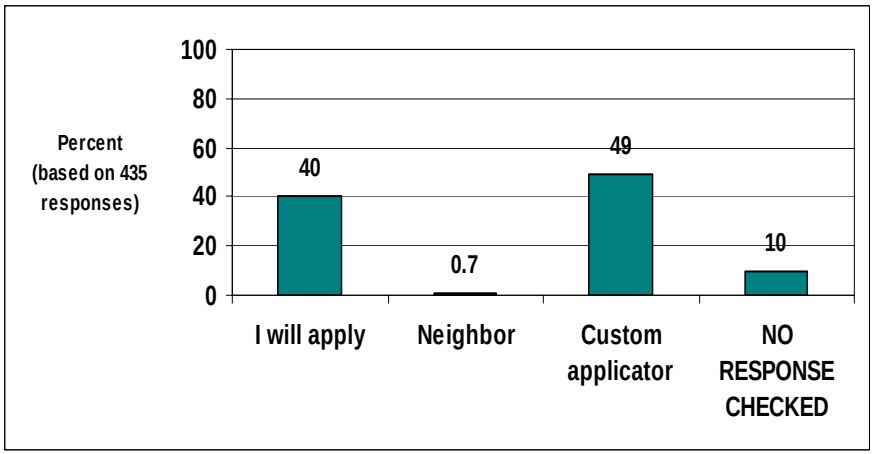
Do you plan to apply a fungicide in 2005 to control soybean rust?



When will you apply a fungicide to control soybean rust?



If fungicides are used, who will apply them?



Because of the threat of soybean rust, I will: (612 responses)