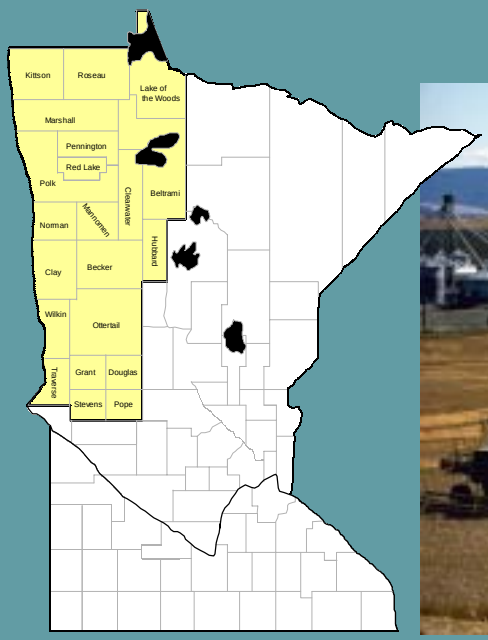
On-Farm Cropping Trials

Northwest and West Central Minnesota

January 2002



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2001 On-Farm Cropping Trials For Northwest and West Central Minnesota

The University of Minnesota is pleased to provide you with the results of the 2001 on-farm field cropping trials conducted in northwest and west central Minnesota.

This is the third year for the trials booklet. It was developed to increase the awareness and impact of the many on-farm cropping projects conducted in Minnesota. The booklet contains summary information for projects on a wide range of management issues for corn, soybeans, small grains, and other regional crops.

This project was made possible thanks to the hard work of many people. This includes farmers, Extension Educators, and specialists who conducted these trials and their names are listed with the results. Also, thank you to our task force and our graphic designer, Theresa HÈbert.

The studies in this booklet are divided into either Research or Demonstration chapters. Included is a description of the difference between the two. Whenever possible, research plot data were analyzed using statistics.

For more information about any of the projects included in this report, please contact the Extension Educator or specialist listed. We invite your input on priorities you believe are important for Minnesota crop producers and have included an evaluation for you to complete and mail to the address printed on the back of the evaluation form.

Sincerely,

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Demonstration Plots

2001 On-Farm Cropping Trials Booklet Evaluation Form

We want to know what you think about this booklet. Please take a few minutes to fill out this evaluation form and mail it to the address on the back of this sheet. Your comments will help shape the future on-farm cropping research and the booklet.

1.) Where did you receive a copy of this booklet? (Check all that apply)

- ☐ In the mail
- ☐ An Extension Educator
- ☐ The local Coop
- ☐ At crop production meetings or field days
- ☐ Other _____

2.) In general, how will you use the On-Farm booklet? (Check all that apply)

- ☐ Read at least some
- ☐ Skim
- ☐ Save for future reference
- ☐ Pass on to a friend
- ☐ Recycle or discard without using
- ☐ Other _____

3.) How would you rate the On-Farm booklet in terms of:

	Excellent				Poor
Design	1	2	3	4	5
Communicating information on our projects	1	2	3	4	5
Clarity and readability	1	2	3	4	5
Interest to you	1	2	3	4	5

4.) How would you describe your profession? (Check all that apply)

- ☐ Farmer/rancher
- ☐ University of Minnesota Faculty
- ☐ Seed/equipment dealer
- ☐ Nonprofit organization
- ☐ State/Federal employee
- ☐ Crop consultant
- ☐ Other _____

5.) I typically get my information about production practices from: (Check all that apply)

- ☐ Other farmers/ranchers
- ☐ Books
- ☐ Farm journals and newsletters
- ☐ Extension or other agency personnel
- ☐ The Internet
- ☐ Other _____

6.) Which information in the booklet was most useful to you in your work?

7.) What research topics would you like to see covered in future booklets?

8.) Do you plan to make any changes in your agricultural practices as a result of information provided in this booklet?

9.) What do you feel would be the economic impact of changing these practices?

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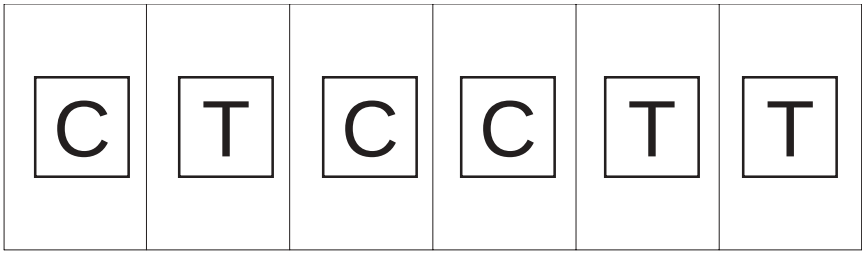
Research Trials

Research plots are randomized and replicated in the field or across geographic locations. Replication is used to increase precision in identifying treatment differences. It allows a statistical analysis of field variation. This analysis will help determine whether detected differences are real due to experimental treatments or due to random chance. Trials are generally replicated in space, time, or both. Randomization reduces the chances of one treatment from being favored in any way.

Some comparisons of treatments may result in little or no statistically significant differences. When this occurs, it is not appropriate to conclude which treatment is superior. A difference of one or two bushels per acre between treatments may or may not represent a true yield advantage. If the small yield advantage continues for several years or over several locations within a single year, more confidence can be placed on that treatment. A minimum difference between means, called the least significant difference (LSD) is required for the observed difference to be attributed to the treatment.

It is critical that final conclusions about a new practice be made only after being evaluated over several years and/or at several locations. If you have any questions about how to conduct your own research trials, call your local University of Minnesota Extension Office.



C = Check Plot
T = Treated Plot

Example of a research plot design - In this example there are 3 replications of two treatments. The location of each treatment and replication was assigned at random.

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Red River Valley Barley Variety Evaluation

Northwest Region

Purpose of Study
Evaluation of released barley varieties for grain yield and grain quality in northwest Minnesota.

Cooperator:	Don Viger	**Nearest Town:**	Fergus Falls, MN
	Wayne Zimmerman		Ulen, MN
	Brian Hest		Perley, MN
	Ray Swenson		Brooks, MN
	Leif Aakre		Stephen, MN
	Curtis W. Swanson		Thief River Falls, MN
	Jim Kukowski		Strathcona, MN
	Gerald Olsonowski		Humboldt, MN
Soil Type:	Sandy loam to clay loam		
Tillage:	Field cultivated		
Previous Crop:	Wheat, soybeans, and canola, varied with cooperator		
Variety:	See table		
Planting Date:	May 1-18, 2001		
Row Width:	7"		
Fertilizer:	Applied by cooperator		
Herbicide:	Buctril & Puma at labeled rates		
Harvest Date:	August 6-28, 2001		
Experimental Design:	Randomized complete block with 2 replications		

Source	Variety	Yield (bu/a)		Yield (% of Mean)		Test Weight (lb/bu)	Plant Height (inches)	Plump (%)
		1 year	3 years	1 year	3 years	1 year	1 year	1 year
Anheuser Busch	Legacy*	83.7	-	101.4	-	44.1	26.8	84.3
NDSU	Foster*	83.7	90.9	101.4	103.9	43.5	27.3	90.4
U of M	Robust*	81.9	85.2	99.3	97.4	45.6	29.0	85.6
NDSU	Conlon*	81.4	-	99.2	-	47.6	26.2	90.3
NDSU	Drummond	81.1	-	98.3	-	44.5	27.4	88.8
U of M	Lacey*	80.5	-	97.6	-	45.6	26.0	85.7
U of M	MnBrite	79.9	86.4	96.9	98.7	45.6	27.8	85.1
LSD (0.05)				**NS#**	**3.1**	**1.5**	**2.1**	**4.5**

*AMBA approved malting barley cultivars
#NS=no significant difference between treatments

For additional information:
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Funding by the Minnesota Barley Council

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Grant County

Iron Coated Fertilizer for Corn Production

Cooperator: Bob Ehlers
Nearest Town: Elbow Lake, MN
Soil Type: Characteristics:
pH -8.0
Free calcium carbonate -8.4% (at 0-6")
Sol. salts -1.5 mmhol/cm^2 (at 0-6")
Tillage: Fall chiseled
Previous Crop: Soybeans
Hybrid: Pioneer 38P06
Planting Date: May 3, 2000
Row Width: 30"
Herbicide: Double Play before planting. Hornet post emergence
Fertilizer: 150 lb N, 90 lb P_2O_5, 30 lb K_2O, 3 lb Zn/a -fall 1999
Planting Population: 30,000
Harvest Date: Mid October 2000
Experimental Design: Randomized complete block with 4 replications

Purpose of Study

Corn grown on soils where iron chlorosis is a problem for soybeans has frequently shown symptoms of iron chlorosis. The study will determine if the application of iron (Fe) in the form of coated fertilizer could improve the yield of corn.

Results

Neither the type of coated fertilizer, the rate of iron applied, nor the placement had a significant effect on yield. However, compared to the plots which did not receive iron, the use of iron products containing citric acid increased yields by about 9 bu/a. Even though this research was conducted at one site for one year there is a potential that iron in a fertilizer program may improve corn yields on these soils.

Iron Rate (lb/a) and Placement (inches)

	In Furrow 2000 Yield* (bu/a)		2 x 2# 2000 Yield* (bu/a)	
Fertilizer	**2.5**	**10**	**2.5**	**10**
Control	**173.2**		**182.6**	
Iron Sulfate	191.6	177.9	180.3	177.9
Coated urea, thin coat iron	183.4	195.8	173.6	188.6
Coated urea, ultra thin coat iron	182.6	189.0	177.3	182.2
Coated urea & citric acid, thin coat iron	184.6	188.7	194.8	187.8
Coated urea & citric acid, ultra thin coat iron	190.4	175.9	180.5	186.8

*Yields adjusted to 15.5% moisture
#2 inches deep and 2 inches to the side of the seed

Funding by Pursell Technologics, Inc.

For additional information:
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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Alternative Cover Crop Variety Evaluation

Red Lake & Kittson Counties

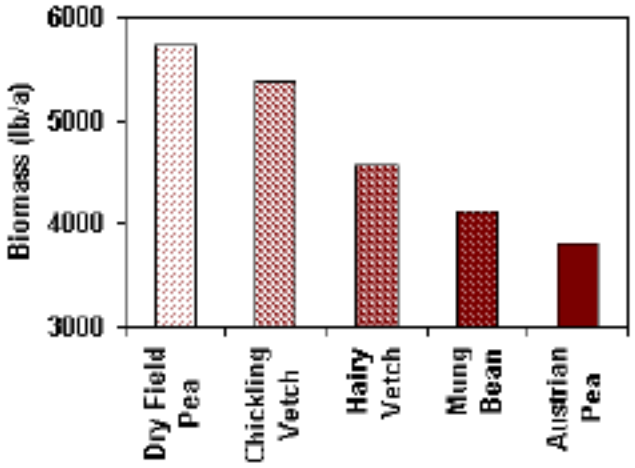
Purpose of Study

Some producers are interested in a cover crop, which can add organic matter and nitrogen to the system, or there are times when producers may not get their main crop seeded and want to plant a cover crop instead of leaving the land fallow. This study compared a number of cover crops with Chickling vetch, which is a new annual cover crop developed in Canada.

Cooperator:	RLF: Monte Casavan K: Rob and Tim Rynning
Nearest Town:	Red Lake Falls (RLF) and Kennedy (K)
Soil Type:	RLF: Foxlake loam K: Northcote clay
Tillage:	Cultivated 3 times at both sites
Previous Crop:	RLF: 1999 fallow, 2000 wheat K: 2000 wheat
Variety:	See table
Planting Date:	RLF: May 15, 2001 K: May 29, 2001
Row Width:	6"
Fertilizer:	RLF: 100-15-0-20S K: 110-32-0-10S
Herbicide:	1.5 pts/a Treflan
Harvest Populations:	See table
Sampling Date:	RLF: August 14, 2001 K: August 27, 2001
Experimental Design:	Randomized complete block with 4 replications

Results

Chickling vetch produced significantly more biomass compared with Mung bean and Austrian pea. Chickling vetch stayed green while field peas were already mature at the sampling date. Chickling vetch and hairy vetch were not significantly different in yield. However, it was more difficult to kill the hairy vetch, because it is a biannual.



	Biomass (lb/a)	Population (plants/ft^2)
Dry Field Pea	5736	7.3
Chickling Vetch	5382	6.5
Hairy Vetch	4564	5.8
Mung Bean	4113	6.1
Austrian Pea	3819	6.1
LSD (0.05)	**863**	**1**

Dry Field Pea: Semi leaf-less, short statured pea. Dry at sampling.
Chickling Vetch: AC Greenfix, annual. Green at sampling setting seed.
Hairy Vetch: Biannual, common hairy vetch. Green at sampling.
Mung Bean: Annual, common Mung Bean. Green at sampling.
Austrian Pea: Annual, common Austrian Pea. Late maturing, long vines. Green at sampling with some seed set.

For additional information:
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Partnerships: Dr. Paul Porter,
Dave LeGare, and Karen Andol
Funding by Red Lake County Crop Improvement Association

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Red Lake County

Niger Seeding Rate Evaluation

Cooperator: RLF: Monte Casavan
K: Rob and Tim Rynning
Nearest Town: Red Lake Falls (RLF) and Kennedy (K)
Soil Type: RLF: Foxlake loam
K: Northcote clay
Tillage: Cultivated 3 times at both sites
Previous Crop: RLF: 1999 fallow, 2000 wheat
K: 2000 wheat
Variety: Earlybird
Planting Date: RLF: May 12, 2001
K: May 29, 2001
Row Width: 6"
Fertilizer: RLF: 100-15-0-20S
K: 60-40-0-0S
Herbicide: 1.5 pt/a Treflan
All plots were hand weeded
Harvest Populations: See table
Harvest Date: RLF: October 9, 2001
K: October 17, 2001
Experimental Design: Randomized complete block with 4 replications

Purpose of Study

Niger *(Guizotia abyssinica)* is a new crop in the region. Farmers have had irregular stands and are not sure about the correct seeding rate. This trial examined seeding rates from extremely low to extremely high rates.

Results

In 2001, there were no significant differences in yield between the different seeding rates. However, the low rates (up to 2 lb/a) had very slow crop establishment. Higher seeding rates started flowering earlier than the lower seeding rates. Based on this year and last year's information and visual observations the seeding rates around 6 lb. provide quick soil cover and good Niger yields.

Seeding Rate (lb/a)	Stand 2001 (plants/ft²)	Flowering July 24* (%)	Crop Height 2001 (Inches)	Test Weight 2001 (lb/bu)	2001 Seed Yield# (lb/a)	2000 Seed Yield (lb/a)
0.5	1.1	14	33.0	29.3	343	202
1.0	1.8	24	34.4	31.4	403	319
1.5	2.5	28	34.1	30.6	415	270
2.0	3.3	25	34.4	32.8	433	332
2.5	4.3	31	35.1	31.6	430	259
3.0	4.9	35	35.0	31.3	422	292
6.0	8.0	53	35.3	30.9	415	394
9.0	12.2	55	35.1	32.2	442	457
12.0	15.3	69	36.3	30.4	410	-
15.0	20.0	68	34.8	31.8	409	-
LSD (0.05)	**1.7**	**10**	**NS**	**NS**	**NS**	**119**

* Data from RLF site only. # Market price is around $0.35/lb.

Partnerships: Dr. Paul Porter,
Dave LeGare, and Karen Andol
Funding by the Red Lake County Crop
Improvement Association

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Niger Tolerance to MCPA

Red Lake County

Purpose of Study

Niger *(Guizotia abyssinica)* is a new crop in the region with few crop protection chemicals labeled for use and limited information on crop safety. In 2001, the Minnesota Department of Agriculture granted MCPA a 24C label for postemergent broadleaf weed control at 0.5 to 1.5 pts/acre. The application timing is restricted to Niger in the 2-leaf to early bud stages of development. This trial evaluates Niger tolerance to two rates of MCPA at four developmental stages.

Cooperator: Monte Casavan
Nearest Town: Red Lake Falls, MN
Soil Type: Foxlake loam
Tillage: Cultivated 3 times
Previous Crop: 1999 fallow, 2000 wheat
Planting Date: May 12, 2001
Variety: Earlybird
Row Width: 6"
Fertilizer: 100-15-0-20S
Application Date: June 12: 2-leaf; June 25: 5-leaf; July 5: 9-leaf; July 13: early bud
Herbicide: 1.5 pt/a Treflan preplant; all plots were hand weeded
Harvest Populations: 10.5 plants/ft^2
Harvest Date: October 9, 2001
Experimental Design: Randomized complete block with 4 replications

Results

In 2001, there were no significant differences in yield from treatments in spite of differences in crop height, delayed flowering, and visual estimates of crop injury. Niger tolerance to MCPA appears to be greatest at the 2-leaf stage and decreases as the plant develops. The high level of injury at the 5-leaf stage is believed to be related to weather conditions on the application date rather than increased susceptibility to MCPA injury at this plant developmental stage.

MCPA Amine Rate (lb/a)	Growth Stage	Seed Yield (lb/a)	Test Weight (lb/bu)	Crop Height (Inches)	Visual Injury August 2 (%)	Flowering July 24 (%)
0	-	417	31.5	33.9	0	53
0.5	2-leaf	415	31.6	31.3	10	33
0.5	5-leaf	411	33.7	19.8	41	29
0.5	9-leaf	413	34.5	29.0	22	33
0.5	Early bud	364	33.5	28.3	27	8
1.0	2-leaf	402	32.2	28.5	15	21
1.0	5-leaf	362	35.3	17.8	58	19
1.0	9-leaf	393	30.4	24.0	38	18
1.0	Early bud	393	29.6	25.5	46	5
LSD (0.05)		**NS**	**NS**	**4.2**	**9**	**9**

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Partnerships: Dr. Paul Porter, Dave LeGare, Karen Andol, and Dr. Carlyle Holen
Funding by the Red Lake County Crop Improvement Association

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Red Lake County

Niger Tolerance to 'Select 2 EC'

Cooperator: Monte Casavan
Nearest Town: Red Lake Falls, MN
Soil Type: Foxlake loam
Tillage: Cultivated 3 times
Previous Crop: 1999 fallow, 2000 wheat
Planting Date: May 12, 2001
Variety: Earlybird
Row Width: 6"
Fertilizer: 100-15-0-20S
Herbicide: 1.5 pt/a Treflan; all plots were hand weeded; 'Select 2 EC' was applied at different rates on June 25, 2001
Harvest Populations: 10.5 plants/ft^2
Harvest Date: October 9, 2001
Experimental Design: Randomized complete block with 4 replications

Purpose of Study

Niger *(Guizotia abyssinica)* is a new crop in the region. In 2001, a 24C registration for 'Select 2 EC' was granted by the Minnesota Department of Agriculture. The label states 'Select 2 EC' can be used for postemergent control of grasses at a rate of 6 to 8 fl. oz/acre. This trial evaluated the tolerance of Niger to four 'Select 2 EC' rates.

Results

In 2001, there were no significant differences in yield, crop height, and flowering date between the different rates. No visual damage could be distinguished between the different treatments. In conclusion, 'Select 2 EC' at the labeled rate can be safely used on Niger.

Treatment (fl oz/a)*	Seed Yield (lb/a)	Test Weight (lb/bu)
Control	440	35.4
3	415	34.2
6	433	35.2
12	411	35.4
24	419	33.0
LSD (0.05)	**NS**	**NS**

*Select 2EC was applied at the 5-leaf growth stage.

Partnerships: Dr. Paul Porter, Dave LeGare, Karen Andol, and Dr. Carlyle Holen
Funding by the Red Lake County Crop Improvement Association

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Organic Oat Variety Evaluation

Polk County

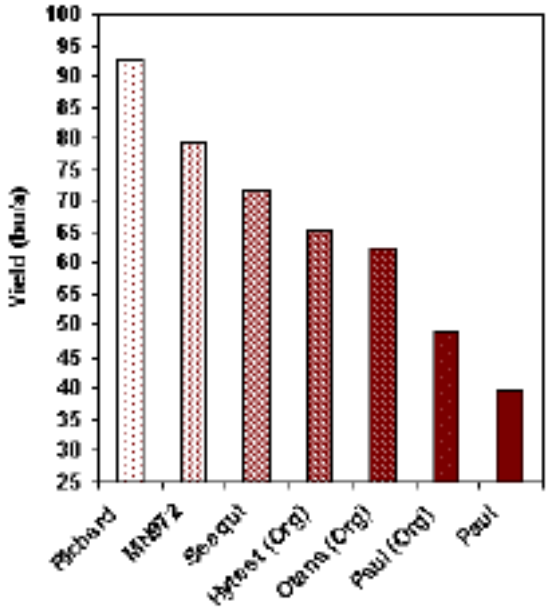
Purpose of Study

To evaluate different oat varieties grown under a certified organic production system. Entries came from either an organic seed source (Org) or a conventional seed source.

Cooperator: Jim and Pat Todahl
Nearest Town: Fertile, MN
Soil Type: Light sandy loam
Tillage: Fall chisel, spring cultivated
Previous Crop: Soybeans
Variety: See table
Planting Date: May 14, 2001
Row Width: 8"
Fertilizer: 3 ton/a turkey manure-fall 2000
Weed Control: Harrowing, 2 times
Harvest Populations: See table
Harvest Date: August 20, 2001
Experimental Design: Randomized complete block with 5 replications

Results

Richard significantly out yielded the other varieties. Test weights for hull-less varieties are significantly higher than hulled varieties. Paul is a hull-less variety, to compare yields, one needs to add about 25% to the reported Paul yield.



Variety	Seed Source	Yield* (bu/a)	Test Weight (lb/bu)	Crop Height (inches)	Lodging Score at harvest#	Population (million/a)
Richard	Conventional	92.6	31.3	37.6	4.3	1.06
MN972	Conventional	79.4	30.2	36.4	4.6	1.29
Sesqui	Conventional	71.7	32.3	36.0	4.4	1.29
Hytest	Organic	65.3	35.6	38.6	4.8	1.12
Otana	Organic	62.5	30.8	39.2	4.8	1.26
Paul	Organic	48.9	41.0	39.0	3.8	1.00
Paul	Conventional	39.7	37.6	38.8	3.9	1.02
LSD (0.05)		**10.8**	**3.8**	**1.9**	**0.6**	**0.24**

*Corrected to 14% moisture
#Score from 0-5: with 5 the oat is completely flat on the ground
Due to strong winds most of the oats were severely lodged

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Partnership: Dr. Paul Porter
Funding by Minnesota Department of Agriculture

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Red Lake & Kittson Counties

Field Pea Variety Evaluation

Cooperator: RLF: Monte Casavan
K: Rob and Tim Rynning
Nearest Town: Red Lake Falls (RLF) and Kennedy (K)
Soil Type: RLF: Foxlake loam
K: Northcote clay
Tillage: Cultivated 3 times at both sites
Previous Crop: RLF: 1999 fallow, 2000 wheat
K: 2000 wheat
Hybrid: See table
Planting Date: RLF: May 12, 2001
K: May 29, 2001
Row Width: 6"
Fertilizer: RLF: none
K: 60-40-0
Herbicide: 1.5 pt/a Treflan
Harvest Populations: See table
Harvest Date: RLF: August 14 & 22, 2001
K: August 21 & 29, 2001
Experimental Design: Randomized complete block with 4 replications

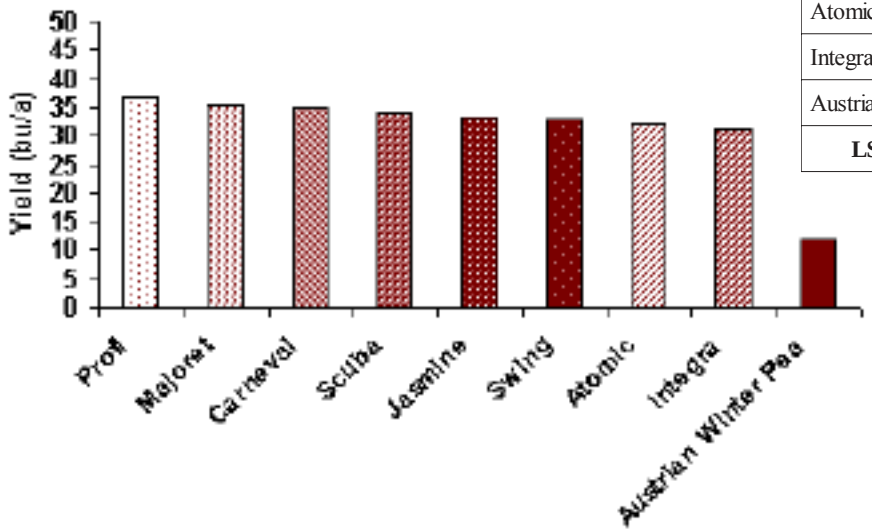
Purpose of Study

To evaluate the performance of field pea varieties for yield and test weight.

Results

Austrian winter pea seeded in the spring in northwest Minnesota yielded significantly lower than all the short statured, semi dwarf varieties. Profi was significantly higher yielding than Integra.

Pea Variety	Yield (bu/a)	Stand 2001 (plants/ft²)	Test Weight (lb/bu)
Profi	36.7	6.4	63.1
Majoret	35.2	6.9	63.3
Carneval	35.1	6.9	63.1
Scuba	33.9	7.3	62.8
Jasmine	33.2	7.9	62.4
Swing	33.0	6.7	62.9
Atomic	32.3	6.2	62.7
Integra	31.0	6.2	62.7
Austrian Winter Pea	12.0	6.4	61.5
LSD (0.05)	**4.8**	**0.8**	**1.0**



Partnership: Dr. Paul Porter, Dave LaGare, and Karen Andol
Funding by Red Lake County Crop Improvement Association

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Soybean Seeding Rate & Iron Chlorosis Evaluation

Grant, Redwood, Swift & W. Ottertail Counties

Purpose of Study

To evaluate the effect of seeding rate on yield in situations where iron chlorosis is a serious problem.

Cooperator: Grant: Noel Kjesbo — **Nearest Town:** Wendell, MN
Swift: David Janson — Benson, MN
West Ottertail: David Hasbargan — Foxhome, MN
Redwood: Don Reding — Morgan, MN

Soil Type: Not known
Tillage: Fall chisel, spring cultivated
Previous Crop: Corn
Hybrid: Pioneer 91B53 & 90B43
Planting Date: May 15-25, 2000
Row Width: 30"
Fertilizer: None
Herbicide: Hand weeded and varied herbicides
Populations: See table
Harvest Date: Early October 2000
Experimental Design: Randomized complete block with 5 replications

Results

These results are from the 2000 crop year. In this year, chlorosis was observed throughout the region. Outcomes are expected to differ for years with less chlorosis. At Ottertail and Swift County sites, yield increased as the plant population increased. At the Redwood and Grant County sites, plant population had no effect on soybean yield. While the results from Redwood and Grant Counties do not provide adequate information to defend use of higher plant population, there is a strong indication that for fields where iron chlorosis is a problem they should have higher plant populations than other fields.

Seeding Rate	Redwood County 2000 Yield (bu/a)	Grant County 2000 Yield* (bu/a)	W. Ottertail County 2000 Yield (bu/a)	Swift County 2000 Yield (bu/a)	Average Across Sites (bu/a)
143,000	35.8	23.4	20.6	7.1	21.7
172,000	34.0	21.8	30.4	17.3	25.9
224,000	48.0	18.7	28.6	23.1	29.6
260,000	41.3	26.0	35.6	38.0	35.2
LSD (0.05)	**NS**	**NS**	**8.5**	**10.8**	-

*Low yields are attributed to excessively wet conditions throughout the growing season.

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Funding by the Minnesota Soybean Research and Promotion Council

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Grant, Redwood & Swift Counties

Iron Coated Soybean Seed & Iron Chlorosis Evaluation

Cooperator: Grant: Noel Kjesbo
Redwood: Don Reding
Swift: David Janson

Nearest Town: Wendell, MN
Morgan, MN
Benson, MN

Soil Type: Not known
Tillage: Fall chisel, spring cultivated
Previous Crop: Corn
Hybrid: Pioneer 91B53 & Pioneer 90B43
Planting Date: May 15-25, 2000
Row Width: 30"
Fertilizer: None
Herbicide: Hand weeded and varied herbicides
Populations: 180,000
Harvest Date: Early October 2000
Experimental Design: Randomized complete block with 4 replications
Iron Coating: 1.0 lb Iron/a

Purpose of Study

To measure the effect of iron coating on the soybean seed as well as iron fertilizers applied with the seed on soybean yield.

Results

These results are from the 2000 crop year. In this year, chlorosis was observed throughout the region. Outcomes are expected to differ for years with less chlorosis. The use of iron chelate with the seed appeared to reduce emergence. The iron coated seed reduced early plant growth, but increased iron uptake by young plants. Reduced yields are attributed to slow early growth and poor growing conditions. Overall, compared to the control, the use of iron fertilizer either near or on the seed produced a decrease in yield. However, at the Grant County site, all iron treatments produced a yield increase.

	Redwood County		Swift County		Grant County	
Treatment	Emergence (plants/a)	2000 Yield (bu/a)	Emergence (plants/a)	2000 Yield (bu/a)	Emergence (plants/a)	2000 Yield (bu/a)
Control	167,700	32.9	145,100	31.8	111,100	15.2
Iron Coated Seed	131,100	32.0	171,600	30.9	128,900	18.1
Iron Chelate with Seed	166,800	30.5	140,300	18.3	75,800	19.7
Iron Coated 46-0-0 with Seed	156,100	32.6	160,300	13.4	131,100	22.6
Iron Coated 0-0-60 with Seed	162,700	28.8	143,300	11.5	105,900	23.3

Funding by Minnesota Soybean Research and Promotion Council

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Iron Chlorosis Variety Evaluation

Stevens, Grant & Wilkin Counties

Purpose of Study

To evaluate tolerance of a number of adapted soybean varieties to iron chlorosis.

Results

Two of the three Roundup Ready locations had little or no discernible iron chlorosis, while the third location had significant chlorosis in only one of four replications. As a result, differences in yield rank between locations (although probably not significant) are most likely due to other environmental conditions (i.e. moisture stress).

	Cooperator:	Nearest Town:
	Grant: Noel Kjesbo	Wendell, MN
	Wilkin: David Hasbargen	Foxhome, MN
	Stevens: WCROC	Morris, MN
Soil Type:	Not known	
Tillage:	Fall chisel, spring cultivated	
Previous Crop:	Corn, sugarbeets	
Hybrid:	See table	
Planting Date:	Grant and Wilkin: May 31, 2001	
Row Width:	30"	
Fertilizer:	None	
Herbicide:	Roundup and conventional program	
Harvest Populations:	185,000	
Harvest Date:	October 4, 2001	
Experimental Design:	Randomized complete block with 4 replications	

Roundup Ready Soybeans (averaged over 3 sites)

Company	Variety	Yield# (bu/a)	Moisture (%)	Iron Chlorosis Rating*	Rating* 7/10/01
Asgrow	AG1301	44.1	9.0	2.3	2.9
Asgrow	AG0801	42.8	9.0	2.0	2.6
Croplan	RT0874	42.0	8.7	2.1	2.6
Asgrow	AG0901	41.8	8.9	2.0	2.8
Prairie Brand	PB810RR	41.8	8.8	1.9	2.5
Croplan	RT1557	39.4	10.9	2.3	3.1
Wensman	W2128	38.9	8.7	2.0	2.6
Gold Country	6009RR	37.1	8.5	1.9	2.6
Wensman	W2075	36.9	8.8	1.6	2.1
Northstar	705	36.6	8.7	1.6	2.3
LSD (0.05)		**4.8**	**1.9**	**0.7**	**0.8**

#Yields adjusted to 13% moisture
*Rating from 1-5, 1=no yellowing and 5=severely chlorotic or dead

Conventional Soybeans (Foxhome site only)

Company	Variety	Yield# (bu/a)	Moisture (%)	Iron Chlorosis Rating*
Ramy	R-1100	44.7	8.9	1.6
Croplan	332	42.6	8.8	1.9
Dairyland	DSR 090	41.9	9.0	1.8
Pioneer	9071	41.8	9.1	2.6
Pioneer	9091	40.0	9.1	2.3
Pioneer	90B43	39.5	9.0	1.7
Richland	MK 1009	39.2	9.6	3.1
Richland	Black Kato	33.3	12.8	3.0
Croplan	983**	27.5	12.5	3.3
Novartis	S0880	24.3	6.7	2.2
Richland	MK 9532**	18.8	8.3	3.9
NDSU	Traill**	15.1	8.8	2.8
LSD (0.05)		**21**	**5.0**	**1.4**

#Yields adjusted to 13% moisture
*Rating 1-5, 1=no yellowing and 5=severely chlorotic or dead
**Varieites had significantly reduced stands

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Funding by Minnesota Soybean and Research Promotion Council

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Beautiful Butterflies and Contemptible Caterpillars

The summer of 2001 brought us throngs of Thistle Caterpillars, abundant Alfalfa Butterflies, dozens of Diamondback Moths, and zillions of Zebra Caterpillars. Most of these species are not common pests in the Northern Great Plains but can be occasional pests when their populations get large enough, as witnessed in 2001. The situation provided an opportunity to examine thresholds, scouting methods and treatments for some infrequently encountered pests. It also allowed us to witness at least one instance of an impressive natural control on a wide geographic scale when Thistle Caterpillar populations succumbed to a widespread disease outbreak.

A recurring question through the summer was ëwhyí? What led to these high populations? Although we canít say for certain, there are a number of factors that probably contributed. Unusual weather fronts early in the season, good overwintering conditions from 1998-2000, and generally good survivorship of offspring all influenced the densities and species of caterpillars present.

Weather is the one of the most important factors influencing insect population dynamics. Because the weather in our region varies so much from year to year, we often experience highly variable insect populations. Our extreme winter temperatures and lack of overwintering hosts/sites often prevent many of our insect pests from overwintering. Consequently, their populations are re-established each summer by individuals immigrating into the region on weather fronts.

Increased survivorship of young also contributes to a populationís growth. Food is often a factor in larval survivorship. The increase in occurrence of Canada thistle in the region may have provided Red Admiral Butterflies (adult Thistle Caterpillars) with increased egg laying sites. Once hatched, the larvae would feed on the thistles before turning to alternate food sources, such as soybean and sunflower.

We donít really know which of these factors (or what other factors) had the greatest influence on our caterpillar problems in 2001; it may well be that they all contributed more or less to the high populations.

Thistle Caterpillar *(Vanessa cardui)* ñ the Thistle Caterpillar is the larva of the Painted Lady Butterfly, a common sight along many country roads, especially in the summer of 2001. The spiny caterpillars are brown or black with a yellow stripe running along each side (Fig. 1). The stiff, upright spines are paler than the body and stand out visibly. The adult butterflies are about 1" long with a wingspan of ~2". The upper surface of the wings are predominantly a brownish-orange, the tips of which are black with white spots (Fig. 2).

Figure 1: Thistle Caterpillar
Note the stiff, upright spines

The Painted Lady breeds throughout the northern US and Canada in the summer and migrates to the southern US for the winter. They return in early June. Eggs are laid mostly on Canada thistle, wild and cultivated sunflower and other host plants. Eggs hatch in about a week and larvae feed for 3-4 weeks. Caterpillars skeletonize leaves, feeding on leaf material between leaf veins. They also produce a webbing which covers them while they feed and may have some protective function, preventing attack by parasitic wasps. Black fecal pellets will often fill this webbing tent. Although they prefer to feed on thistle, these caterpillars have been recorded as attacking a number of crops, including soybeans, sunflower, canola, and various vegetables.

Figure 2: Painted Lady Butterfly

(Continued on page 20)

West Central Research and Outreach Center (WCROC)
Morris, Minnesota

The WCROC mission is to provide leadership in the generation and dissemination of research-based knowledge that addresses agricultural and rural issues. WCROC research and education priorities emphasize interdisciplinary projects, with partners that range from producers to consumers of agricultural products, through citizen-guided programs.

Research Areas

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Dairy
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Forage Management
Sheep
Soil Science
Water Quality
Horticulture Gardens
Swine
Alternative Swine Systems
Irrigation and Drainage
Community Leadership
Forage and Grazing Based Livestock Systems

Educational Programs

Ag Professional Update, January 16, 2002
Irrigation Conference, February 2002
Winter Crops Day, February 2002
Drainage Workshop, March 2002
Summer Station Day, June 2002
Horticulture Night, July 25, 2002
Grazing Workshop, August 2002
Sheep & Grazing Day, September 2002
Cattle Feeders Day, December 2002

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Northwest Research and Outreach Center (NWROC)
Crookston, Minnesota

The mission of the NWROC is to contribute, within the framework of the Minnesota Agricultural Experiment Station (MAES) and the College of Agricultural, Food and Environmental Sciences, to the acquisition, interpretation and dissemination of research results to the people of Minnesota, with application to the knowledge base of the United States and World. Within this framework, major emphasis is placed on research and education that is relevant to the needs of northwest Minnesota, and which includes projects initiated by Center scientists, other MAES scientists and state or federal agencies.

Research Areas

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Sugarbeets
Potatoes

Educational Programs

Ag Professional Update, January 2002
Summer Field Day, July 2002

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(Continued from page 17)

Alfalfa Butterfly *(Colias eurytheme)* ñ There were few windshields that didnít claim some of these butterflies, also called the Orange Sulfer, in the summer of 2001 (Fig. 3). The larvae of alfalfa butterfly, referred to as alfalfa caterpillars, are a bright green larvae with a prominent white stripe down each side and will grow to 1.25" . They will feed on alfalfa, clover, soybeans, and other legumes and in heavy populations may cause significant defoliation. Although we had very high populations of adults throughout the summer, there were only localized reports of damage.

Figure 3: Adult Alfalfa Butterfly

Large flights of adults were present throughout the latter part of the summer in 2001. Many of these were males, who patrol for receptive females. After mating, the females will lay eggs on the tops of leaves of host plants. Once hatched, the caterpillars start to feed on the tops of leaves and later attack the leaf tips. They overwinter as pupae and emerge as adults the following year.

Figure 4: Variegated Fritillary Caterpillar

Variegated Fritillary *(Euptoieta claudia)* ñ Variegated Fritillary are an orange-brown butterfly with black spots around the outer margins of its wings and is present throughout the US and Canada except in the Pacific Northwest. There is one generation per year and the adults fly in the late summer. Eggs are laid on a variety of flowering plants (often on violets and Johnny jumpups) and hatch in 3-4 days. Larvae feed at night on the underside of leaves. The larvae are predominantly an orange-red with white longitudinal stripes that are bordered in black. They have strong, black stripes that are covered in spines (Fig. 4). They pupate on the underside of leaves and the chrysalis is a silky white, marked by gold colored bumps. Although many reports came in of variegated fritillaries on garden vegetables, flowers and flax, there were no reports of populations that required treatment.

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Norman County — Soybean Population & Iron Chlorosis Evaluation

Cooperator: Mark Harless
Nearest Town: Borup, MN
Soil Type: Wheatville silty loam
Tillage: Fall chisel, spring cultivated 2 times
Previous Crop: Sugarbeets
Hybrid: See table
Planting Date: June 7, 2001
Soil Test: June 4, 2001: P-15 ppm, K-246 ppm, Zinc-1.35 ppm, Mg 1360 ppm, Ca 5700 ppm
Sol. Salts: 1.28 mmhol/cm
Row Width: 6"
Fertilizer: None
Herbicide: 1.5 pts/a Roundup Ultra on July 10, 2001
Populations: 175,000
Harvest Date: October 18, 2001
Experimental Design: Randomized complete block with 3 replications

Purpose of Study

To evaluate two Roundup Ready varieties at a constant population with a conventional variety added at different populations to determine differences in iron chlorosis severity and yield.

Results

Chlorosis scores were close to one, which indicated chlorosis was not a problem this year. Treatments did not have an effect on reducing chlorosis.

Variety	Treatment	Yield (bu/a)	Chlorosis Rating*	Plant Population
Pioneer 90B11	Control	21.7	1.2	193,000
	50K	16.6	1.0	294,000
	100K	19.3	1.0	283,000
	150K	20.5	1.2	252,000
	200K	16.6	1.2	236,000
LSD (0.05)		**NS**	**NS**	-

Variety	Treatment	Yield (bu/a)	Chlorosis Rating*	Plant Population
Prairie Brand 0120	Control	15.7	1.5	182,000
	50K	13.8	1.3	152,000
	100K	13.8	1.3	184,000
	150K	14.2	1.2	194,000
	200K	16.4	1.0	221,000
LSD (0.05)		**NS**	**NS**	-

*1=no sign of chlorosis and 5=severely chlorotic or dead

Partnerships: Seth Naeve
Funded by Minnesota Soybean and Research Promotion Council

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Soybean Iron Chlorosis Evaluation

Kittson & Roseau Counties

Purpose of Study

To evaluate two Roundup Ready varieties at a constant population with a conventional variety added at different populations to determine differences in iron chlorosis severity and yield.

Results

Treatments did not have an effect on reducing chlorosis. This could be due to low incidence of chlorosis for 2001. There was a yield difference between varieties.

County: Kittson and Roseau
Nearest Town: Kennedy and Roseau
Tillage: Spring cultivated 2 times
Previous Crop: Spring wheat
Planting Date: June 6, 2001
Hybrid: See table
Row Width: 10"
Herbicide: Roundup Ultra
Planting Population: 175,000 of Roundup Ready variety
See table for conventional soybean rate
Harvest Date: October 19, 2001
Experimental Design: Randomized complete block with 3 replications

Variety	Treatment	Yield (bu/a)	Test Weight (lb/bu)	Moisture (%)
Pioneer 90B11	Check	19.5	3.4	25.1
	50K	21.5	3.7	25.4
	100K	19.8	3.5	25.1
	150K	19.2	3.4	24.7
	200K	19.3	3.4	24.9
LSD (0.05)		**NS**	**NS**	**NS**

Variety	Treatment	Yield (bu/a)	Test Weight (lb/bu)	Moisture (%)
Prairie Brand 0120	Check	10.8	2.0	23.3
	50K	13.5	2.4	23.8
	100K	10.2	1.9	23.0
	150K	11.0	2.0	23.8
	200K	14.0	2.5	24.4
LSD (0.05)		**NS**	**NS**	**NS**

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Funding by Minnesota Soybean Research and Promotion Council

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Roseau County

Soybean Variety Evaluation

Cooperator: Kraig Lee
Nearest Town: Wannaska, MN
Soil Type: Mustinka clay loam
Tillage: Chisel plowed
Previous Crop: Spring wheat
Hybrid: See table
Planting Date: June 6, 2001
Row Width: 10"
Fertilizer: None
Herbicide: Conventional: 1.5 pts/a Storm, 1.5 pts/a crop oil on July 3, 2001
Roundup Ready: 1.5 pts/a Poast, and Roundup on July 3, 2001
Populations: 200,000
Harvest Date: October 20, 2000
Experimental Design: Randomized complete block with 4 replications

Purpose of Study
To evaluate conventional and Roundup Ready soybean varieties for yield.

Roundup Ready Soybeans

Company	Variety	Yield* (bu/a)
Interstate	XR0110Y90	9.8
Proseed	0039	9.8
Northstar	0205	9.4
Stine	S0070-4	9.3
Northrup King	S00N7	8.9
Croplan	RT0218	8.8
Asgrow	009	8.7
Pioneer	90B11	8.6
Hyland	Rugged	8.1
Peterson	0201Arr	8.0
Pririe Brand	0121	8.0
Prairie Brand	0091	7.8
Northstar	0314	7.2
Proseed	0079	7.2
Midwest	GR0525	6.8
Dekalb	002	5.9
LSD (0.05)		**3.9**

*Yield adjusted to 13% moisture. Yields were low due to soybeans not being inoculated and were planted into field never planted to soybeans.

Conventional Soybeans

Company	Variety	Yield* (bu/a)
Peterson	Lena	17.8
Pioneer	90A07	16.1
Mycogen	5007	14.6
Mycogen	S34	13.3
NDSU	Jim	13.2
Northstar	0005	12.4
Proseed	9038	11.9
Midwest	G0091	11.1
Pioneer	90B43	11.1
Novartis	S0066	10.5
U of M	Exp 201	10.4
Croplan	0083	10.2
Proseed	8069	9.7
Stine	ex0077-6	9.1
Northstar	0105	8.7
OAC	Atwood	8.3
Croplan	0077	8.0
NDSU	Walsh	7.9
U of M	Exp 302	7.7
LSD (0.05)		**5.9**

*Yield adjusted to 13% moisture. Yields were low due to soybeans not being inoculated and were planted into field never planted to soybeans.

Partnerships: Dr. Dean Reynolds and represented seed companies
Funding by Minnesota Soybean Research and Promotion Council

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Soybean Variety Evaluation

Norman County

Purpose of Study
To provide local soybean yield and quality information on conventional and Roundup Ready varieties.

Cooperator: Mark Harless
Nearest Town: Borup, MN
Soil Type: Wheatville silty loam
Tillage: Fall chisel, spring cultivated 2 times
Previous Crop: Sugarbeets
Planting Date: June 7, 2001
Soil Sol. Salts: 1.28 mmhol/cm
Row Width: Solid seeded
Fertilizer: None
Herbicide: Roundup Ready: 1.5 pts/a Roundup Ultra on July 10, 2001
Conventional: 4 oz/a Raptor + NIS 0.05 on July 10, 2001
Population: 200,000
Harvest Date: October 18, 2001
Experimental Design: Randomized complete block with 4 replications

Conventional Soybeans

Company	Variety	Maturity	Yield* (bu/a)	Protien* (%)	Oil* (%)
Pioneer	90B43	0.4	42.4	31.2	22.1
Thunder	0598	0.5	38.5	30.7	21.9
Golden Harvest	H-0440	0.4	38.3	30.9	21.6
NDSU	Jim	00.6	37.5	33.5	20.3
Mycogen	13	0.1	36.8	32.4	20.8
Peterson	LENA	00.8	35.4	34.2	20.5
Wensman	W3030	0.3	34.7	31.1	21.7
U of M	MN0302	0.2	34.0	33.6	20.5
U of M	MN0201	0.1	33.2	34.1	20.2
NDSU	Walsh	0.0	32.9	32.2	21.1
Pioneer	9071	0.7	32.9	29.8	22.3
Stine	SO300-0	0.3	32.7	30.7	21.3
Mycogen	5007	00.7	32.6	33.3	21.0
Northstar	0005	00.5	31.7	31.6	21.5
Mycogen	S34	00.9	31.6	31.5	21.6
Proseed	9038	0.3	31.5	32.9	20.9
Proseed	8069	0.7	31.1	29.5	22.3
Cargill	B031	0.3	30.3	35.5	19.3
Croplan	I0083	00.8	30.2	32.0	21.4
Legend	LS009	00.9	28.7	34.0	20.3
Pioneer	90A07	00.7	28.3	35.1	20.6
OAC	Atwood	00.8	26.8	35.8	19.6
Northstar	NS0001	0.0	24.4	29.9	22.0
Northstar	0105	0.1	23.4	32.9	21.3
Hyland	Corona	0.2	17.6#	33.9	21.2
LSD (0.05)			**8.7**	-	-

*Adjusted to 13% moisture
#Yield low due to excessive shattering

Roundup Ready Soybeans

Company	Variety	Maturity	Yield* (bu/a)	Protein* (%)	Oil* (%)
Dekalb	0651	0.5	37.6	32.6	19.5
Northstar	314	0.3	34.5	30.9	21.0
Hyland	Rugged	0.4	33.4	30.0	21.5
Northrup King	S00-N7	0.0	32.3	31.0	20.3
Golden Harvest	0537	0.5	32.1	31.6	19.9
Proseed	0079	0.7	30.4	29.0	19.5
Northstar	0205	1.5	30.3	32.9	20.5
Atlas	B5033	0.3	30.2	35.3	18.9
Wensman	W2039	0.3	29.2	31.3	20.9
Pioneer	90B11	0.1	28.9	33.6	19.7
Dekalb	0009	0.9	28.5	30.3	20.9
Pioneer	90B72	0.7	27.9	31.4	18.6
Thunder	607	0.6	27.7	32.4	19.1
Legend	0598	0.5	26.8	30.8	20.5
Northrup King	S02-G2	0.2	25.8	30.8	20.6
Prairie Brand	0121	0.1	23.5	32.1	19.8
Proseed	0039	0.3	22.6	32.1	21.1
Prairie Brand	0091	0.9	20.9	32.2	20.2
Atlas	BX51020	0.2	20.8	31.2	20.5
Dekalb	002	0.2	6.2	33.3	19.9
LSD (0.05)			**14.3**	-	-

*Adjusted to 13% moisture

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Partnership: Dr. Dean Reynolds
Funding by seed companies

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Polk County

Soybean Variety Evaluation

Cooperator: Chris and Ken Hove
Nearest Town: Fosston, MN
Soil Type: Hedman loam
Tillage: Field cultivated
Previous Crop: Wheat
Variety: See table
Planting Date: June 7, 2001
Row Width: 10"
Fertilizer: None
Herbicide: Conventional Soybeans: Frontier, Basagran, and Poast
Roundup Ready Soybeans: Roundup
Harvest Populations: 200,000
Harvest Date: October 4, 2001
Experimental Design: Randomized complete block with 4 replications

Purpose of Study

To provide local soybean yield and quality information on conventional and Roundup Ready varieties.

Results

Significant differences were measured for yield, % oil and % protein in both the Roundup Ready and conventional soybean variety trials.

Roundup Ready Soybeans

Company	Variety	Yield* (bu/a)	Oil* (%)	Protein* (%)
DeKalb	06-51	39.4	18.2	34.8
Asgrow	0009	38.5	18.4	32.9
Atlas Brand	5033	37.7	16.8	36.7
Northrup King	S00-N7	37.4	17.2	34.9
Hyland	Rugged	37.1	19.1	34.1
Northrup King	S02-G2	36.9	17.9	33.3
North Star	0205	36.9	18.4	34.0
Pioneer	90B11	36.8	17.4	34.0
Wensman	2039	36.4	19.0	34.4
North Star	0314	34.8	19.0	34.0
Pioneer	90B72	32.6	18.3	35.4
Atlas	X51020	32.2	18.1	34.1
Average		**36.4**	**18.1**	**34.4**
LSD (0.05)		**2.9**	**0.5**	**1.4**

*Adjusted to 13% moisture

Conventional Soybeans

Company	Variety	Yield* (bu/a)	Oil* (%)	Protein* (%)
Mycogen	5007	39.6	18.0	34.1
North Star	0001	39.0	17.7	33.8
Pioneer	90B43	38.9	17.7	33.8
Pioneer	9071	38.2	18.1	33.1
Hyland	Corona	37.0	17.8	34.3
Wensman	3030	36.4	17.7	33.9
U of M	0302	35.9	17.5	35.2
Mycogen	013	35.3	17.0	36.0
U of M	0201	34.8	16.2	37.5
NDSU	Jim	34.8	16.8	35.4
NDSU	Walsh	33.6	17.8	34.0
Average		**36.4**	**17.5**	**34.6**
LSD (0.05)		**3.7**	**0.4**	**0.9**

*Adjusted to 13% moisture

Partnerships: Polk County Extension, U of M Department of Agronomy, Dr. Dean Reynolds
Funding by seed companies

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Soybean Variety Evaluation

Kittson County

Purpose of Study

To compare Roundup Ready and conventional soybean varieties for yield, oil, and protein.

Results

Yields tend to be higher with the earlier harvested beans. This may be due to using two different combines for harvest, which were set up differently. Also shattering may have occurred during harvest due to the maturity of the later harvested beans. To compare varieties equally, look at the early harvested as ne group and the later harvested as another.

Cooperator: Archie Lundell Jr.
Nearest Town: Kennedy
Soil Type: Wheatville
Tillage: Cultivated 2 times
Previous Crop: Wheat
Variety: See table
Planting Date: June 6, 2001
Row Width: 10"
Fertilizer: 80 lb N, 30 lb P, 30 lb K/a
Herbicide: Roundup soybeans: 2 pt/a Roundup Ultra
Conventional soybeans: 1 qt/a Basagran, 1 Ω pt Poast and 1 Ω pts Crop oil
Planting Populations: 200,000
Harvest Date: Early varieties 9/28/01, all others 10/19/01
Experimental Design: Randomized complete block with 4 replications

Roundup Ready

Company	Variety	Yield# (bu/a)	Protein# (%)	Oil# (%)
Northrup King	S00N7	33.4	32.5	18.5
Hyland	Rugged	33.3	32.7	18.5
Prairie Brand	0091	32.8	35.0	17.9
Pioneer	90B11	28.1	31.1	18.3
Proseed	0039	25.2	33.0	18.8
Midwest	GR0525	20.5	32.0	18.4
Interstate	XR0110Y90	20.3	35.1	17.3
Stine	Soo 70-4	20.2	33.4	17.8
Proseed	0079	19.8	32.8	18.4
North Star	0314	17.7	31.7	19.0
Prairie Brand	0121	17.4	33.5	18.6
North Star	205	14.6	33.5	17.9
Croplan	RT0218	12.7	31.5	19.0
Dekalb	002	5.1	0	0
Peterson	0201Arr	3.9	34.1	17.3

#Yield, protein, and moisture were adjusted to 13% moisture

Conventional

Company	Variety	Yield# (bu/a)	Protein# (%)	Oil# (%)
Mycogen	5007*	65.8	31.5	18.8
Pioneer	90A07*	62.7	33.2	19.2
Mycogen	S34*	58.4	31.7	18.6
Mycogen	S34*	58.4	31.7	18.6
NDSU	Jim*	57.5	33.2	17.6
Peterson	Lena*	54.6	33.5	17.8
Novartis	S0066*	53.3	33.2	17.2
Croplan	0083*	46.5	32.8	17.9
Pioneer	90B43	45.9	33.8	18.0
NDSU	Walsh	41.5	35.3	17.9
Midwest	G0091	39.2	33.3	17.9
Stine	ex007-6	38.2	31.0	18.8
Northstar	0005	37.5	30.2	19.1
OAC	Atwood	36.9	33.6	18.6
Northstar	0105	34.7	34.1	18.7
U of M	Exp 302	33.5	35.4	17.5
Proseed	9038	32.6	34.9	17.2
Croplan	0077	30.4	33.3	17.5
U of M	Exp 201	30.3	36.5	16.7
Proseed	8069	29.0	32.7	18.6

#Yield, protein, and moisture were adjusted to 13% moisture
*Varieties harvested September 28, 2001. All other varieties harvested October 19, 2001 due to later maturity

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Northwest Region — Red River Valley Wheat Variety Evaluation

Cooperator:	Don Viger	**Nearest Town:**	Fergus Falls, MN
	Wayne Zimmerman		Ulen, MN
	Brian Hest		Perley, MN
	Ray Swenson		Brooks, MN
	Leif Aakre		Stephen, MN
	Curtis W. Swanson		Thief River Falls, MN
	Jim Kukowski		Strathcona, MN
	Gerald Olsonowski		Humboldt, MN

Purpose of Study
Evaluation of released wheat cultivars for grain yield, lodging, and grain quality in northwest Minnesota.

Soil Type: Ranging from sandy loam to clay loam
Previous Crop: Wheat, canola, and soybeans, varied with cooperator
Variety: See table
Planting Date: May 1-18, 2001
Row Width: 7"
Fertilizer: Applied by cooperator
Herbicide: Buctril or Puma
Harvest Date: August 6-28, 2001
Experimental Design: Randomized complete block with 2 replications

		Actual Yield (bu/a)		Yield (% of Mean)		Plant Height (inches)	Lodging* (1-5)	Test Weight (lb/bu)
Source	Variety	1 year	3 years	1 year	3 years	3 years	3 years	3 years
SDSU	Walworth	64.9	-	108.5	-	-	-	-
SDSU	Oxen	64.6	64.1	108.1	115.5	31.8	1.9	57.8
Northstar Genetics	Mercury	63.9	-	106.8	-	-	-	-
Northstar Genetics	Dandy	63.3	-	105.9	-	-	-	-
AgriPro	NorPro	62.7	-	104.9	-	-	-	-
NDSU	Reeder	62.7	61.0	104.9	109.9	33.1	1.8	57.5
Pioneer Hi-bred	2375	60.9	59.4	101.9	107.1	31.8	3.7	58.7
Agriculture Canada	AC Vista	60.6	-	101.3	-	-	-	-
AgriPro	Ivan	60.4	64.6	101.0	116.3	31.2	1.5	57.7
SDSU	Forge	60.3	57.4	100.9	103.4	33.2	2.3	58.4
U of M	McVey	60.0	63.1	100.4	113.6	33.1	3.4	56.2
SDSU	Ingot	59.4	59.6	99.3	107.4	35.4	2.8	60.7
SDSU	Russ	59.1	61.4	98.8	110.7	34.4	2.5	57.5
U of M	Verde	58.1	59.6	97.1	107.3	32.0	2.2	57.9
NDSU	Alsen	57.6	-	96.3	-	-	-	-
U of M	HJ98	57.4	60.7	96.0	109.3	31.8	3.5	56.9
U of M	Marshall	57.4	56.3	95.9	101.5	30.5	2.5	56.4
NDSU	Parshall	56.9	56.1	95.2	101.1	35.9	2.1	59.6
AgriPro	Gunner	55.7	49.5	93.1	89.1	34.5	2.3	58.0
Cropland Genetics	McKenzie	53.7	-	89.8	-	-	-	-
TriGen Genetics	Ozzie	53.0	-	88.6	-	-	-	-
LSD (0.05)				**9.7**	**7.7**	**0.7**	**-**	**0.7**

* 1 = fully upright and 5 = flat to the ground

Funding by Minnesota Wheat Research and Promotion Council

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Organic Wheat Variety Evaluation

Polk County

Purpose of Study

To evaluate different spring wheat varieties grown under a certified organic production system. Entries came from either an organic seed source or a conventional seed source.

Results

Yield from Ingot was greater than many of the tested varieties, but not significantly different in yield from Gunner, Reeder, Waldron and Kulm. In organic production, protein premiums are a major part of the income. Gulpro provided the highest protein content followed by Coteau.

Cooperator: Jim and Pat Todahl
Nearest Town: Fertile, MN
Soil Type: Light sandy loam
Tillage: Fall chiseled, spring cultivated
Previous Crop: Soybeans
Variety: See table
Planting Date: May 14, 2001
Row Width: 8"
Fertilizer: 3 ton/a turkey manure-fall 2000
Weed Control: Harrowing, 2 times
Harvest Populations: See table
Harvest Date: August 20, 2001
Experimental Design: Randomized complete block with 5 replications

Variety	Seed Source	Yield* (bu/a)	Protein (%)	Test Weight (lb/bu)	Gross Revenue# ($)	Height (inches)	Population (million/a)
Ingot	Conventional	44.5	14.0	60.0	271	38.7	1.45
Gunner	Conventional	41.2	13.8	60.0	241	36.0	1.36
Reeder	Conventional	40.8	13.7	59.3	232	33.4	1.40
Waldron	Conventional	40.3	14.3	56.2	253	38.8	1.40
Kulm	Conventional	38.5	13.7	59.5	218	37.2	1.40
Alsen	Conventional	36.8	14.0	59.6	221	33.4	1.36
Parshall	Organic	36.0	13.6	58.6	201	38.2	1.33
Grandin	Conventional	35.5	14.1	57.6	216	33.6	1.28
Ernest	Conventional	34.4	14.0	59.2	208	39.8	1.36
Stoa	Organic	33.0	13.8	56.7	194	39.8	1.19
Parshall	Conventional	32.7	13.4	59.7	177	38.2	1.08
Coteau	Conventional	32.0	15.7	56.3	234	39.0	1.38
Coteau	Organic	30.9	15.5	56.6	224	39.4	1.34
Gulpro	Conventional	30.1	16.4	55.4	231	42.8	1.26
LSD (0.05)		**6.3**	**0.5**	**1**	**48**	**1.8**	**NS**

*Corrected to 13.5% moisture
#Protein premium is $0.10/0.1% for 13.0 to 15.0% protein and $0.05/0.1% for protein >15.0%. Base price is $5.00/bu.

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Partnerships: Dr. Paul Porter
Funding by Minnesota Department of Agriculture

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Polk County

Organic Wheat Weed Control Evaluation

Cooperator: Jim and Pat Todahl
Nearest Town: Fertile, MN
Soil Type: Light sandy loam
Tillage: Fall chisel, spring cultivated
Previous Crop: Soybeans
Variety: Alsen and Reeder
Planting Date: May 14 and 28, 2001
Row Width: 8"
Fertilizer: 3 ton/a turkey manure
Weed Control: See table
Harvest Date: August 20, 2001
Experimental Design: Randomized complete block with 2 replications

Purpose of Study

To identify and develop cultural practices for weed control in organically grown hard red spring wheat.

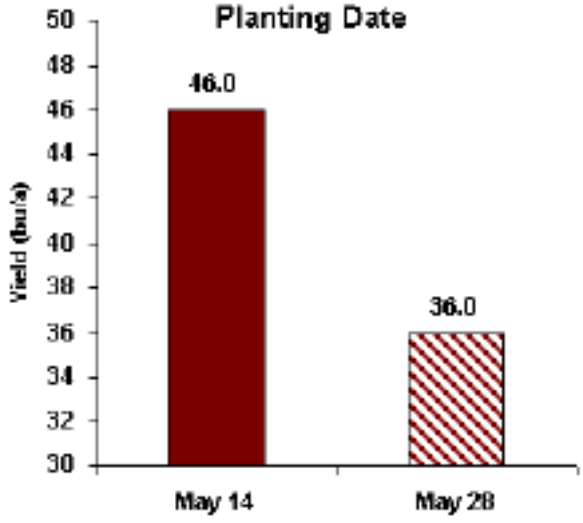
Results

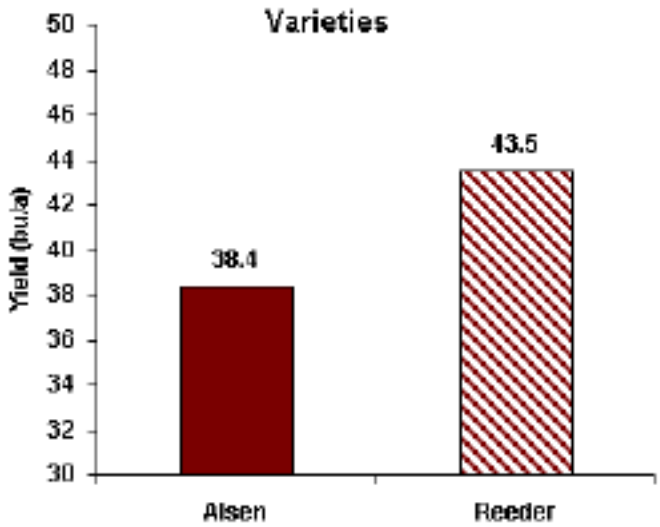
Stand: Before wheat plants were 8" tall, harrowing reduced stand by an average of 8%, while harrowing wheat plants that were over 8" reduced stand an average of 3%. Harrowing is most effective when performed while wheat and weeds are small even though there is more stand loss. Producer experience would suggest that organic wheat farmers should plant an additional 10% pure live seed for every planned harrow operation. These results may vary with soil type and weather conditions.

Yield: The variety Reeder yielded significantly better than Alsen (5.1 bu/a). May 14 planting resulted in significantly better yields than May 28 planting (10 bu/a). The number of harrow operations did not significantly affect yield.

Weed Control: Weed control was not significantly affected by planting date or number of harrow operations. There was, however, a significant varietal effect. Reeder had significantly less weeds than Alsen.

Harrow Treatment	Yield (bu/a)
3-4 times	40.3
4-5 times	41.7
5-6 times	40.9
LSD (0.05)	**NS**





Partnerships: U of M Extension Service and Dr. Paul Porter
Funding by Minnesota Department of Agriculture

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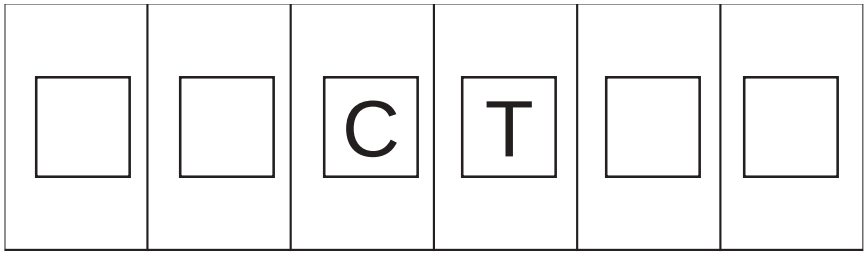
Demonstration Plots

The purpose of demonstration plots is to allow visual observation of differences between two or more treatments. However, demonstration plots, such as strip tests, may have a serious problem with field variability, which can make the results misleading. A statistical approach is a more meaningful way to compare treatments.

Replication is a key part of statistical methods because it addresses variability within a treatment due to other factors. However, farmers may not be willing to replicate treatments in a strip plot trial, with the same treatments applied to all farms. Thus, each farm is a replicate.

A second concern in the validity of demonstration plots is biasing results by placing a favorite treatment on a preferred block of land. This can be avoided by randomly allocating treatment positions in the field by some independent mans (e.g. drawing numbers from a hat). Randomization of treatments within a field is an extremely important factor contributing to the final reliability of the results.



C = Check Plot
T = Treated Plot

Example of a demonstration plot design - Here two treatments are compared. However, with no replication, there is no assessment of natural variability and difference cannot be validated statistically.

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Norman County

Corn Hybrid Demonstration

Company	Hybrid	Yield (bu/a)	Test Weight (lb/bu)	Moisture (%)
Dekalb	DK 307	155.2	57.0	16.1
Dekalb	DK334 Bty	165.9	56.0	16.9
Dekalb	DKC-33-08	169.6	58.5	17.1
Dekalb	DKC-36-71	166.0	54.0	16.3
Golden Harvest	H6113	157.1	56.5	18.7
Golden Harvest	H6389	159.9	54.5	18.7
Hyland	HL B255Bt	155.3	57.0	17.0
Hyland	HL2222	154.4	58.0	17.4
Interstate	107	162.2	57.0	15.5
Interstate	155	154.2	58.0	17.3
Interstate	8977	157.0	59.0	16.4
Legend	LS 6084	160.9	55.0	17.1
Legend	LS 6781	159.9	54.5	18.3
Mycogen-Cargill	1877	163.6	60.0	19.1
Mycogen-Cargill	1950LL	158.2	57.0	18.7
Northrup King	N17-R3	160.6	56.5	19.0
Northrup King	N17C5	162.1	54.5	21.0
Pioneer	39A26	166.7	58.0	17.6
Pioneer	39D81	167.6	55.0	19.8
Pioneer	39F06	161.6	54.0	17.3
Pioneer	3941	150.3	57.5	19.4
Thunder	2182	155.9	55.0	18.0
Thunder	2184	165.0	54.0	16.9
Wensman	W-5048Bt	156.4	57.0	19.2
Wensman	W-4053	152.7	54.5	20.3
Wensman	W-5088Bt	160.3	55.0	21.0
Wensman	5018Bt	144.8	56.5	18.3

*Yields adjusted to 15.5% moisture

Purpose of Study
Evaluate the performance of corn hybrids for yield, test weight, and moisture content.

Cooperator: Skaurud Grain Farms
Nearest Town: Mahnomen, MN
Soil Type: Wheatville silty loam
Tillage: Fall chiseled, spring cultivated
Previous Crop: Sugarbeets
Hybrid: See table
Planting Date: May 18, 2001
Row Width: 22"
Fertilizer: Fall: 13-32-42
Spring: 5 gal 10-34-0
+ 190 lb/a Urea + 1 qt/a zinc
Herbicide: Double Play
Planting Population: 32,000
Harvest Date: November 2, 2001
Experimental Design: Strip trial

Funded by seed companies represented

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Corn Silage Variety Demonstration

Norman County

Purpose of Study
To demonstrate yield, nutrient content, and milk production potential of corn silage varieties in a demonstration strip trial.

Cooperator: Dan and Allan Grunhovd
Nearest Town: Fertile, MN
Soil Type: Waukon loam
Tillage: Plowed, cultivated
Previous Crop: Wheat
Planting Date: May 19, 2001
Row Width: 36"
Fertilizer: Dairy manure (amount unknown)
Herbicide: Preplant: Doubleplay 5 pts + 0.27 lbs Atrazine
Post: Distinct 5 oz + 1 qt 28% N with 3.2 oz surfactant
Insecticide: 3.0 oz/a Warrior
Planting Populations: 30,000
Harvest Date: September 25-26, 2001

	As is (T/a)	As is Harvest Moisture (%)	DM (T/a)	DM Starch (%)	Crude Protein (%)	ADF DM (%)	NDF DM (%)	Net Energy Lact.	"milk2000" Milk (lb/DM Ton)	"milk2000" Milk ($/a)
Cargill 2720 Bt	14.88	67.2	4.9	30.8	9.0	23.1	39.9	0.75	3638	$2,132
Cargill F227**	13.08	67.1	4.3	35.1	8.4	21.6	39.0	0.77	4042	$2,090
Cargill F377**	13.36	67.7	4.3	32.0	8.5	22.4	39.7	0.76	4021	$2,080
Croplan DS85	15.17	63.5	5.5	26.8	8.9	26.0	44.4	0.72	3494	$2,325
Croplan DS95	19.38	67.0	6.4	31.5	7.9	24.8	42.0	0.73	3577	$2,746
Croplan S101098RR	16.25	69.5	5.0	25.4	7.7	27.6	46.6	0.70	3429	$2,043
Dekalb 39-45	15.98	61.1	6.2	34.7	7.3	22.8	38.7	0.76	3637	$2,714
Dekalb DKC 33-08	12.56	57.8	5.3	38.4	7.0	23.4	39.3	0.75	3531	$2,247
Dekalb DKC 36-71	15.84	62.9	5.9	35.3	8.0	22.6	38.5	0.76	3688	$2,602
Hyland H-255#	10.35	57.9	4.4	33.8	7.7	23.9	39.6	0.74	3534	$1,849
Interstate 155	10.81	66.8	3.6	25.9	7.1	28.6	46.6	0.69	3432	$1,480
Interstate 8909	16.55	58.3	6.8	33.3	7.7	24.2	40.4	0.74	3530	$2,890
Interstate 8966	13.18	63.1	4.9	30.1	6.2	27.2	45.5	0.70	3472	$2,028
Interstate 8992	11.80	57.2	5.1	31.8	5.9	26.6	45.5	0.71	3345	$2,026
Northrup King N17-R3	12.19	61.9	4.6	34.9	7.9	23.1	39.4	0.75	3633	$2,024
Northrup King NX1519	11.34	58.7	4.7	37.8	8.0	21.6	36.4	0.77	3647	$2,048
Northrup King N48-V8	21.86	67.0	6.6	20.6	8.8	27.7	47.3	0.70	3226	$2,541
Pioneer 38K06	13.7	60.7	5.4	37.4	7.3	22.1	37.7	0.77	3448	$2,347
Pioneer 38K06	13.73	60.6	5.4	33.3	7.0	24.3	41.4	0.74	3543	$2,301
Pioneer 39A26	12.56	58.4	5.2	36.1	6.6	23.5	39.6	0.75	3543	$2,223
Seeds 2000 2801	14.39	53.3	6.7	46.1	8.3	16.9	30.7	0.83	3629	$2,929
Seeds 2000 2841 RR	15.89	63.2	5.9	34.0	6.9	25.1	42.9	0.73	3577	$2,511
Wensman W-4053	13.45	61.5	5.2	33.8	6.3	25.7	42.8	0.72	3526	$2,191

Assumptions: Milk price =$12/cwt.; Milk/DM Ton, Milk/Acre, and Milk $/Acre are based on the Milk 2000 formula.
NDF invitro digestibility lab value set at 55 except on brown midrib varieties** where 65 was used.
Milk 2000 is a U of W Extension Silage Evaluation System; Shaver, Lauer, Coors, Schwab, & Hoffman.
#Variety had severe wildlife damage.

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Funding by Norman/Mahnomen Forage Council

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Norman County

Soybean Variety Demonstration

Cooperator: Larry Hellerud
Nearest Town: Ada, MN
Soil Type: Bearden Fargo silty clay loam
Tillage: Fall chiseled, spring cultivated & dragged
Previous Crop: Wheat
Planting Date: June 6, 2001
Row Width: 6"
Fertilizer: None
Herbicide: Roundup Ready Soybeans: 26 oz/a Roundup Ultra on July 5, 2001
Conventional Soybeans: 4 oz/a Altra Blazer and 1 pt/a Quad on July 2, 2001
Planting Populations: 294,000
Harvest Date: October 5 and 20, 2001

Purpose of Study
To compare conventional and Roundup Ready soybean varieties for differences in yields and chlorosis rating in a demonstration strip trial.

Conventional Soybeans

Company	Variety	Maturity	Chlorosis Rating*	Yield (bu/a)
Cargill	B031	0.3	2.5	36.3
Golden Harvest	H-0440	0.4	4	33.0
Hyland	Corona	00.2	2	37.2
Legend	0009	00.9	3	35.1
Legend	LS0308	0.3	4	33.2
Mycogen	013	0.1	3	37.2
NDSU	Jim	3	3	32.9
NDSU	Trails	0.0	2	36.7
Northstar	NS0001	00.1	3	37.6
Pioneer	9071	0.7	3	37.4
Pioneer	90B43	0.4	2	38.4
Stine	SO300-0	0.3	3	33.8
Thunder	598	0.5	2	37.5
U of M	MN0301	0.3	2.5	36.3
Wensman	W3030	0.3	2.5	37.3

*1=no sign of chlorosis and 5=severely chlorotic or dead

Roundup Ready Soybeans

Company	Variety	Maturity	Chlorosis Rating*	Yield (bu/a)
Atlas#	B076	0.7	3	35.6
Croplan	RT0313	0.3	2	33.5
Dekalb	0651	0.5	2	39.5
Dekalb	0009	00.9	2	31.7
Golden Harvest	0537	0.5	2.5	36.7
Hyland	Rugged	0.3	2.5	31.8
Hyland#	Rally	0.7	1	32.9
Legend	0598	0.5	3	36.1
Northrup King	S00-N7	0.7	2	28.0
Northrup King	S02-G2	0.2	2.5	27.3
Northrup King#	S06-L6	0.6	1.5	33.7
Northstar	0314	0.3	2.5	26.6
Northstar	0205	0.5	3	33.3
Pioneer	90B11	0.1	1.5	35.4
Pioneer#	90B72	0.7	2	31.9
Prairie Brand#	PB0770	0.7	1	34.1
Seeds 2000	2020	0.2	2.5	22.3
Seeds 2000#	2070	0.7	1	32.3
Thunder#	607	0.6	1	33.9
Wensman	W2039	0.3	2.5	29.1

*1=no sign of chlorosis and 5=severely chlorotic or dead
#Harvested on October 20 due to equipment problems

Funding by seed companies represented and Norman County Educational Funds

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Soybean Variety Demonstration

Pope County

Purpose of Study
To evaluate conventional and Roundup Ready soybean varieties for yield and test weight in a demonstration strip trial.

Cooperator: Vernon Pooch
Nearest Town: Farwell, MN
Soil Type: Silt clay loam
Tillage: Chisel plowed and field harrowed
Previous Crop: Corn
Hybrid: See table
Planting Date: May 17, 2001
Row Width: 30"
Fertilizer: 9-23-30-3S-12Zn
Herbicide: 5 oz/a Raptor and 1.5 oz/a First Rate
Plant Populations: Planted 160,000; harvested 127,750
Harvest Date: October 4, 2001
Experimental Design: Strip trial

Roundup Ready

Compnay	Hybrid	Yield (bu/a)	Test Weight (lb/bu)
Asgrow	AG0801	49.8	57.3
Asgrow	AG0901	43.6	57.0
Cargill	B076RR	48.8	58.0
Dahlco	9090RR	49.8	57.0
Dekalb	06-51	50.0	57.0
Garst	9909RR	47.9	56.0
Golden Harvest	1565RR	48.5	57.0
Midwest	6R1545	50.0	57.0
Mycogen	5115RR	47.0	57.0
Northstar	NS1016	48.1	58.0
Pioneer	91B33	49.6	56.0
Producers	089RR	50.0	56.0
Producers	0988RR	51.7	56.5
Stine	Stine	50.0	57.0
Wensman	2098RR	44.2	56.5
Ziller	7106RR	50.8	56.5

Conventional Soybeans

Compnay	Hybrid	Yield (bu/a)	Test Weight (lb/bu)
Croplan	L0983	54.3	57.0
Dahlco	9122	50.6	57.0
Dekalb	13-81	54.4	57.5
Garst	51148	54.4	56.5
Mycogen	5093	49.0	57.5
Northrup King	X9910	55.3	56.5
Northstar	NS1006	53.0	57.0
Pioneer	9091	49.9	57.0
Pioneer	91B53	54.4	57.5
U of M	0901	50.8	57.0
U of M	0902 CN	48.0	57.5
Wensman	3148	50.4	57.0
Ziller	6120	54.5	56.5

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Partnerships: Minnesota Soybean Growers Association
Pope County Corn and Soybean Growers Association

Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2002

Mahnomen County

Soybean Variety Demonstration

Cooperator: Ray Bisek
Nearest Town: Mahnomen, MN
Soil Type: Hamerly
Tillage: Fall chiseled, spring cultivated 3 times
Previous Crop: Wheat
Hybrid: See table
Planting Date: Roundup Ready: June 5, 2001
Conventional: June 7, 2001
Row Width: 6"
Fertilizer: 10S-35-45 soil test high fertility
Herbicide: Roundup Ready Soybeans: 1.5 pts/a Roundup Ultra on June 30, 2001
Conventional Soybeans: 1 pt/a FlexStar on July 2, 2001
+ 1 pt/a Poast on July 9, 2001
Harvest Populations: 250,000
Harvest Date: November 20, 2001

Purpose of Study
To compare conventional and Roundup Ready soybean varieties for yield, test weight, and % moisture in a demonstration strip trial.

Conventional Soybeans

Company	Variety	Maturity	Yield* (bu/a)	Test Weight (lb/bu)	Moisture (%)
Cargil	B031	0.3	46.6	54	13.8
Dekalb	002	00.2	27.6	54.5	13.2
Golden Harvest	H0440	0.4	48.9	53	13.6
Hyland	Corona	0.2	39.7	55.5	14.0
Legend	LS0090	00.9	52.0	54	14.0
Legend	LS0308	0.3	45.6	54	14.4
Mycogen	013	0.1	53.1	53.5	14.5
Mycogen	5007	00.7	47.0	53.5	14.5
NDSU	Council	0.5	46.7	54	14.0
NDSU	Jim	00.6	44.9	56	14.3
NDSU	Trail	0.0	45.9	56.5	14.7
NDSU	Walsh	0.0	39.5	55.5	14.4
North Star	0001	0.0	45.6	57	14.8
Pioneer	9071	0.7	50.6	55	14.0
Pioneer	90B43	0.4	47.7	54.4	14.2
Stine	S 0300-0	0.3	48.2	53.5	13.8
Thunder	0598	0.5	44.7	55.5	14.0
U of M	Aggasiz	0.0	43.8	53.5	14.5
U of M	0301	0.3	48.9	53	14.2
Wensman	W3030	0.3	51.1	53.5	13.9

*Yield adjusted to 13% moisture

Roundup Ready Soybeans

Company	Variety	Maturity	Yield* (bu/a)	Test Weight (lb/bu)	Moisture (%)
Asgrow	0009RR	00.9	51.7	53	13.5
Atlas	B5033RR	0.3	47.7	54.5	13.5
Atlas	X51020RR	0.2	48.8	52.5	13.3
Cargil	B0321	0.3	43.2	56	13.8
Dekalb	0651	0.5	51.2	52.5	13.1
Golden Harvest	0537RR	0.5	47.8	55	13.3
Hyland	Rally	0.7	44.5	54	13.1
Hyland	RR Rugged	0.4	56.6	55	14.4
Legend	LS0598RR	0.5	56	54.5	13.7
North Star	0205 RR	0.5	53.4	53.5	14.3
North Star	0314RR	0.3	59.1	55	13.9
Northrup King	S00N7	00.7	51.7	53	13.5
Northrup King	S02-G2	0.2	52.4	53.5	13.2
Northrup King	97-905	0.5	47.4	54	14.1
Pioneer	90B11	0.1	54	54.5	13.8
Pioneer	90B72	0.7	47.3	54	14.3
Seeds 2000	2020RR	0.2	56.9	53.5	13.3
Seeds 2000	2070 RR	0.7	36.7	54	13.4
Thunder	607 RR	0.6	46.7	55	14.3
Wensman	W2039RR	0.3	52	54	14

*Yield adjusted to 13% moisture

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Source: 2001 On-Farm Cropping Trials Northwest and West Central Minnesota
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Iron Chlorosis in Soybean

Iron deficiency is a common yield-limiting factor for soybeans grown on high pH, calcareous soils. This problem is widespread in western Minnesota. Iron deficiency causes an early season yellowing, or chlorosis, to occur. Although soybeans may grow out of the chlorosis, yields can be reduced. In severe cases, the soybeans can die. The occurrence of chlorosis varies in severity from year to year. The 1999 and 2000 crop seasons had a high degree of chlorosis. Research at the University of Minnesota is under way to develop management practices to reduce the effects of chlorosis. Some management variables that affect chlorosis are explained below.

Management Practices:

Variety - Choosing chlorosis tolerant varieties is the most important management practice for producers with chlorosis problems.

Diagnosis - Many plant stresses cause chlorosis symptoms. Yellow soybeans should be diagnosed properly before changing management. In addition to iron deficiency, chlorosis can occur from wet soils, insects, Soybean Cyst Nematode, root rots, and herbicide damage.

Soil Management - Tillage practice and cultivation affect chlorosis, but specific recommendations are still under evaluation.

Herbicides - Crop injury from herbicides can be severe for chlorotic soybeans. Using safe weed control approaches is one part of a chlorosis management program.

Iron Fertilizers - Use of foliar application or in-furrow application of fluid iron-containing fertilizers has resulted in a variable response and has generally not been cost effective. Current work at Crookston and Morris are evaluating the use of iron seed treatments with some promising results.

A preliminary trial conducted in Swift County in 1999 was designed to evaluate the impact of three iron fertilizers on the yield of both a tolerant and susceptible variety. The results are listed in the following table.

	Variety	
Treatment*	**Susceptible**	**Tolerant**
No iron fertilizer	17.4	29.8
0-0-60 coated with iron	22.6	39.7
Iron sulfate	24.7	36.8
Iron chelate	19.8	38.1

* The rate of iron applied with all materials was 5 lb. per acre

For more information about Iron Chlorosis in soybeans, contact Neil Hansen (WCROC) at 320-589-1711 or Ken Pazdernik (Norman County) at 218-784-7183.

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