

W A T E R



Q U A L I T Y

Mid-Nebraska Demonstration Project

1990

**Field Demonstrations of
Best Management Practices
to Protect Groundwater Quality**

Study
305.1
UNE

Soil Conservation Service
University of Nebraska Cooperative Extension

SCREC-91/2



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Description of the Project

The Mid-Nebraska Water Quality Demonstration Project (MNWQDP) began in March, 1990 with the authorization of USDA of USDA funds to support the project. There are four primary objectives:

1. Foster adoption of management practices that will reduce nutrient and pesticide loading in the soil.
2. Promote producer adoption of irrigation management practices that provide adequate moisture to growing crops while reducing the leaching of agricultural chemicals to groundwater.
3. Demonstrate that producers can achieve suitable economic returns while utilizing management practices that reduce inputs and chemical leaching to groundwater.
4. Effectively address critical water quality issues in Nebraska by integrating the resources and expertise of appropriate federal, state and local agencies and organizations.

The project area includes nearly 2 million acres of the most productive corn ground in Nebraska (see map). It is characterized by irrigation, deep silt loam soils and water tables 50 to 50-feet deep. Water sampling and deep sub-soil testing during the past ten years show high levels of nitrate below the root zone and an increase in nitrate contamination of well water.

The Project Committee which provides direction for the project, is composed of representatives from Cooperative Extension (CE), Soil Conservation Service (SC), Agricultural Stabilization and Conservation Service (ASCS), Nebraska Department of Environmental Control, four Natural Resources Districts (Upper Big Blue, Little Blue, Lower Republican and Tri-Basin), Agricultural Research Service, UNL Conservation and Survey Division and the Blue River Association of Groundwater Districts. Each demonstration site is under the direction of local county committees which is composed of the county CE, SCS, ASCS and local producers and agribusiness representatives.

The two general issues that will be addressed at the demonstration sites are the amount and timing of chemical water applications. These are the primary factors that influence the risk of agrichemical leaching to groundwater. The demonstrations use proven management practices that manipulate these two factors to minimize the risk of groundwater pollution.

Description of a Demonstration Site

A demonstration site is an entire field owned and operated by a local producer-cooperator. A field history is developed by the operator in consultation with the local county Extension agent, district conservationist and the project technologist. Problems, both routine and those unique to the site, are identified and the operator describes the management plan that will address these problems while still attaining a reasonable yield with minimum risk of chemicals leaching beyond the root zone.

The local committee of producers, agency and agribusiness representatives decides which practices should be highlighted as a demonstration for area producers. These specific practices are contained in the field at a smaller scale to minimize the risk associated with comparing against non-recommended practices that are in common use in the area.

Common to most demonstration sites are field length strips showing nitrogen management. Each strip is the width of the nitrogen fertilizer applicator; a minimum of eight rows wide. Each strip will be under just one treatment for the five-year duration of the project. The nitrogen treatments are as follows: a recommended rate, a rate of 50 pounds more nitrogen than recommended and a rate with 50 pounds less nitrogen than recommended. These three treatments are repeated four times in the field resulting in 12 nitrogen treatment strips. The recommended rate is based on the University of Nebraska-Lincoln formula that includes the following factors:

- Yield goal = average yield for the past 5 years plus 5 percent.
- Research based information for nitrogen required to meet the yield goal.
- Credit for soil nitrate in the root zone based on four-foot deep soil samples.
- Credit for irrigation water nitrate based on nitrate test of well water during the previous season.
- Credit for previous legume crop such as soybeans or alfalfa.
- Credit for manure applications.

These factors are explained in detail in NebGuides G87-829 "Fertilizer Nitrogen Management Practices" and G89-913 "Adjusting Nitrogen Fertilizer for Corn Based on Nitrate Levels in Soil and Irrigation Water."

The strips are combine harvested, weighed in a weigh wagon and adjusted to 15.5 percent moisture. Soil samples are taken from each strip during the autumn. Nitrogen treatments for the next year will be based on the residual nitrate in the recommended-rate strips.

All sites are irrigated, most with a gravity-flow system. Soil types, slopes and general field lay-out are evaluated by the Soil Conservation Service. Recommendations are made where changes can be economically installed and provide for a more efficient use of irrigation water. The effect of the changes are demonstrated where possible and will be evaluated with computer models.

Methods of irrigation scheduling are demonstrated at each site. The checkbook method is used in most cases. Moisture blocks are also used, primarily to calibrate the "hand-feel" method of soil moisture testing. Water meters are used at with each site to provide accurate information on the amount of water applied. The meters also indicate variability in the well output that may need to be accounted for during the season.

Field scouting was the basis for pest control at each site in 1990. Most sites were scouted by professional consultants. European corn borer, rootworm and other insect treatments were based on field information and economic thresholds recommended by the consultant. Weeds are also pests that were treated based on field information. Consultants scouted the demonstration fields as they would of nonparticipating producers fields.

From 1991 to 1994, the approach to pest control will be to minimize herbicide use without creating a financial loss to the producer. Atrazine will be targeted for reduction since it is the primary herbicide found in Nebraska groundwater. Possible demonstration practices will include control alternatives such as crop rotation, effective use of idle acres, banded treatments, using lowest effective rates, pre- and post-emergence alternatives, and cultivation. Proper mixing of pesticides and avoiding spills near wells will also be emphasized. The combination of field scouting and using known economic thresholds reduces the chemical loading in soils by eliminating the routine application approach to pest management. Beetle and larvae control methods will be demonstrated at some sites.

In the spring of 1991, the project staff is holding a meeting with area consultants to determine what is currently being done by the consultants in terms of irrigation scheduling and economic thresholds. The project staff will then attempt to equalize the recommendations from the consultants so that treatments across all the sites will be similar.

Figure 1. Example of plot layout for nitrogen rate strips

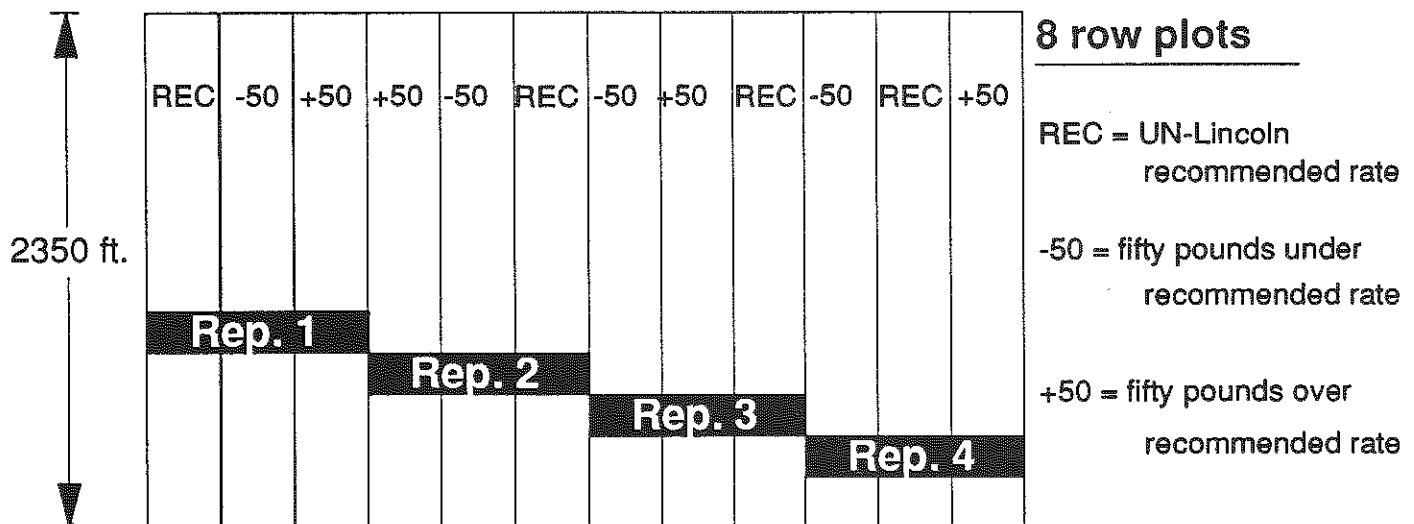


Figure 2. Example of computer model for European Corn Borer control

Second Generation European Corn Borer Control

Number of plants counted	101
Number of egg masses	6
Average number of eggs/mass	19
Estimated percent of eggs laid	89
Estimated percent survival	25
Projected number of borers/plant	
with no treatment	.32
Estimated percent effectiveness of insecticide	75
Projected preventable loss	2 bu/acre
Treatment cost	\$12.00 /acre
Benefit of no treatment, corn @ 2.30/bu	\$7.40 /acre

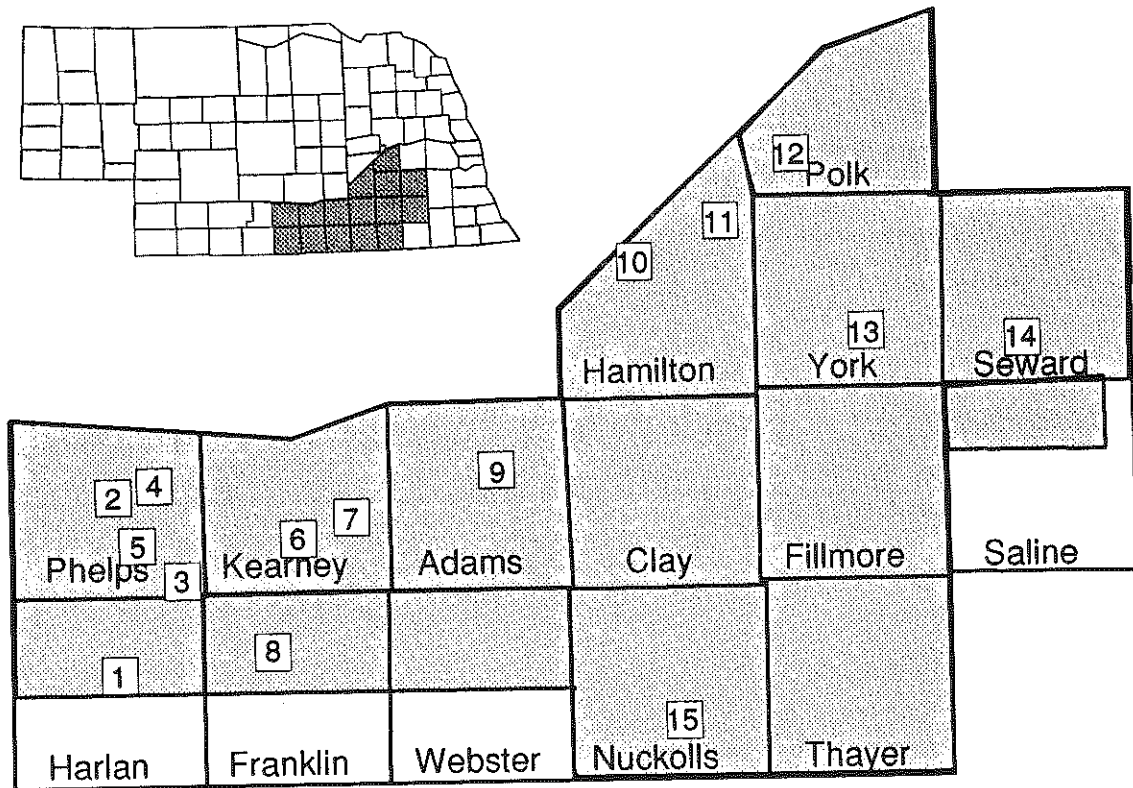
W A T E R



Mid-Nebraska Demonstration Project

Q U A L I T Y

The project staff want to thank the following cooperators for participating in the project in 1990



- | | |
|------------------|------------------|
| 1 Al Hollertz | 9 Milton Ruhter |
| 2 Chris Erickson | 10 Curt Carlson |
| 3 Stan Hansen | 11 Joel Anderson |
| 4 Lloyd Erickson | 12 Mark Newcomer |
| 5 Bruce Anderson | 13 Brad Rathje |
| 6 Dean Casper | 14 Doug Cast |
| 7 Dave Nielsen | 15 Don Kottmeyer |
| 8 John Jelken | |

Mid-Nebraska Water Quality Demonstration Project 1990 Summary

The Mid-Nebraska Water Quality Demonstration Project (MNWQDP) is a cooperative effort among agencies, private business and irrigated crop producers to voluntarily adopt management practices that reduce the threat of chemical contamination of groundwater. The project is supported by special USDA water quality initiative funds and state and local resources to establish 30 demonstration sites in the 15-county area of south central Nebraska. Each site will demonstrate management practices that reduce the exposure of groundwater to agricultural chemicals. The project began in the spring of 1990 with 15 sites.

Nitrogen management practices were demonstrated at 12 of the sites in 1990. The nitrogen treatments were applied in replicated field-length strips based on University of Nebraska-Lincoln recommendations, which included non-traditional practices of crediting soil nitrate in the root zone and from nitrates in the irrigation water. Treatments with nitrogen applied at rates 50-pounds above and 50-pounds below the recommended rate were also replicated at these sites to demonstrate the accuracy of the recommended practices.

Four of the sites reduced the nitrogen application rate an average of 44 pounds per acre with no yield loss by crediting root zone nitrate. Two sites reduced their application rate of nitrogen by 20 pounds per acre by crediting irrigation water nitrate. At ten of the 12 sites, the yield from the recommended-rate strips equalled or exceeded the yields of the 50-pounds-above rate. The average yields for the recommended, above-recommended and below-recommended strips were 170 bushels/acre, 171 bu/acre and 168 bu/acre, respectively.

Irrigation flows were metered and scheduled at all sites. Surge valves were demonstrated at four of the sites. Each of the producers that used the surge valves reported that they were satisfied with them; they perceived that application times and runoff volume were decreased, resulting in more uniform applications. Four of the producers are working on long term plans to make significant field changes such as using reuse pits and field leveling.

Fields were scouted by private consultants, producers and the project technologist in 1990. Rootworm control was based on a spring insecticide treatment on six of the fifteen sites and summer beetle control on three fields. One field was not treated for rootworms as it was planted to soybeans the previous year. European corn borer (ECB) treatments were based on field scouting. Two of the fields were treated for both first- and second- generation ECB. Three cooperators relied on the rootworm beetle treatment to control second generation ECB. Four fields were treated for first generation ECB and one was treated for second generation ECB. Scouting and an economic threshold computer model¹ were used on one field and showed that the cost of the treatment exceeded the predicted preventable yield loss. By choosing not to treat, a savings of \$7.40 per acre was realized (using a predicted preventable yield loss of 2 bushels of corn per acre valued at \$2.30/bu and a treatment cost of \$12.00/acre).

The project will continue through 1994. The nitrogen treatments will be repeated for the duration of the project on the same sites. Other practices to be demonstrated in the coming years include the use of crop rotation, proper manure management, chemical substitutions, timing of fertilizer and pesticide applications and irrigation scheduling techniques.

¹European Corn Borer Phenology and Management Software, Version 1.0, Randall A. Higgins et. al, Kansas State University, 1987, Modified by James S. Berry, University of Nebraska-Lincoln, 1988.

Table 1. 1990 plot summary

Site	Used in N rate recommendation				Measured during season		
	Yield goal (bu/A)	Require N (lbs/A)	Residual N (lbs/A)	Est. H ₂ O N	Actual H ₂ O N (ppm)	N Rate applied (lbs/A)	Yield ¹ (bu/A)
1	175	233	126	0	6.7	60 110* 160	165 a 166 a 170 a
2	175	233	81	20	6.9	82 132* 182	145 ab 148 a 143 b
3	170	227	82	0	9.5	100 150* 200	176 a 175 a 178 a
6	175	233	110	0	1.1	75 125* 175	149 c 165 b 173 a
8	160	215	47	0	9.1	120 170* 220	184 a 186 a 176 b
9	180	239	51	0	4.2	90 140* 190	174 ab 173 b 177 a
10	200	264	36	10	7.3	168 218* 268	204 ab 204 b 206 a
11	170	227	50	20	8.6	110 160* 210	150 a 149 a 147 a
12	175	233	29	9	1.6	145 195* 225	185 a 185 a 185 a
13	170	227	43	0	1.8	135 185* 235	191 b 193 ab 195 a
14	160	215	33	0	3.0	130 180* 230	147 a 147 a 147 a
15	160	215	88	0	0.7	80 150* 180	151 a 152 a 155 a

* University of Nebraska-Lincoln recommended rate to achieve given yield goal.

¹ Yields with the same letter are not significantly different at the 5% level.

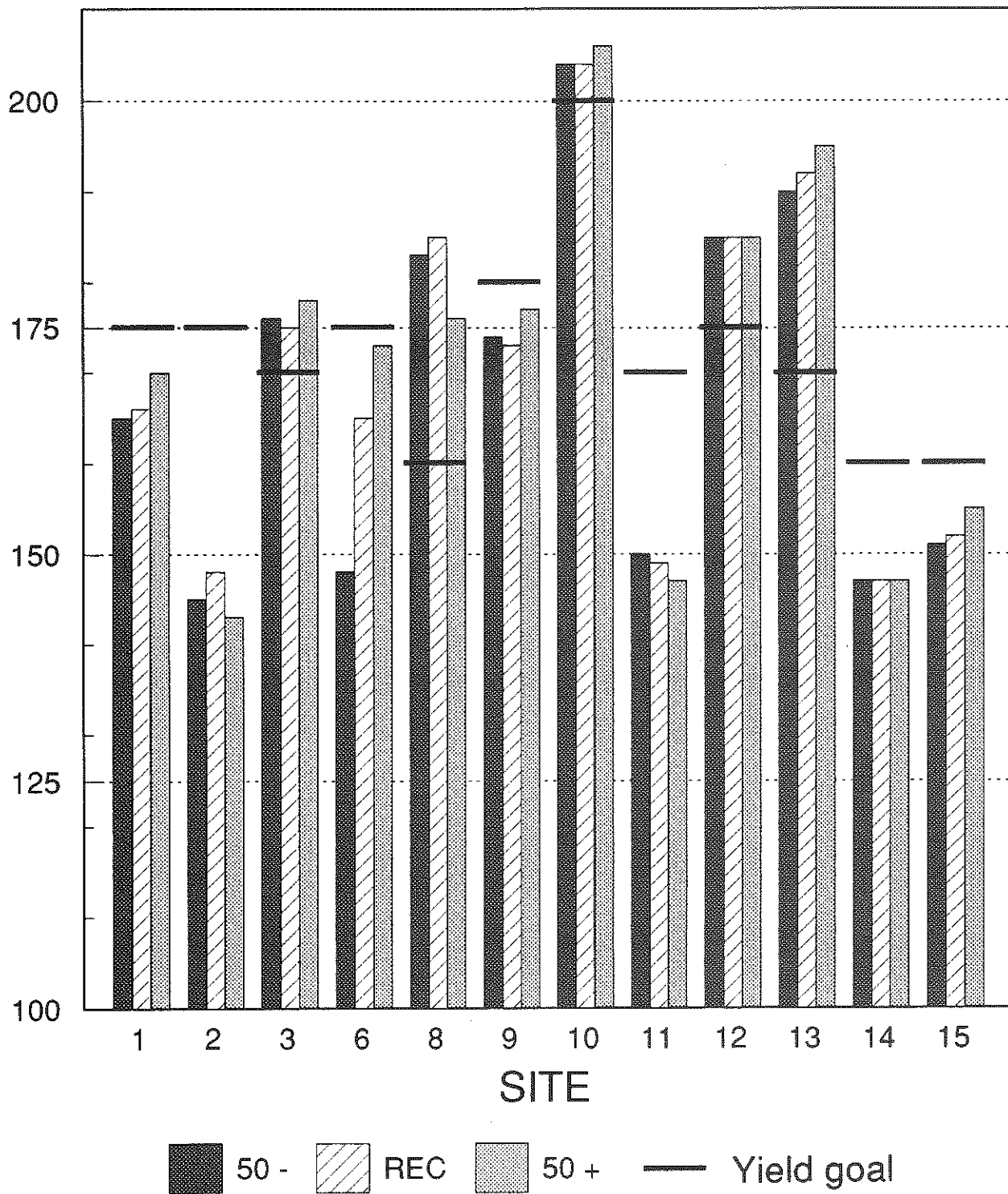
Table 2. Corn rootworm and european corn borer (ECB) control strategy

Site No.	CORN ROOTWORM	EUROPEAN CORN BORER	
	Application Timing	1st Gen.	2nd Gen.
1	AERIAL *		
2	AERIAL *		
3	AERIAL *		
6		HILLING	
8		HILLING	AERIAL
9		HILLING	
10	PLANTING	HILLING	AERIAL
11	CULTIVATION		
12	CULTIVATION	HILLING	
13		HILLING	
14	CULTIVATION		AERIAL
15	PLANTING		

* rootworm beetle treatment relied upon for 2nd generation ECB control

Table 3. Yield goal and actual yields of 1990 sites

YIELD (bu/acre)



DEMONSTRATION PLOT
DATA SUMMARIES
1990

PLOT INFORMATION: Al Hollertz Site

Site 1 was located on the Al Hollertz farm north and west of Ragan, NE. Harlan County. The soil type was Holdrege silt loam 0-1% slope.

Plot strips were six rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Preceding Crop: corn	Starter applied: 10 gal 10-34-0 banded
Preplant soil preparation: ridge tilled	Nitrogen application method: sidedress anhydrous ammonia
Planting date: April 26, 1990	Herbicide applied: 2 pt Atrazine broadcast at planting
Hybrid planted: Northrup King 9540	Insecticide applied: 2 pt Pennacap-M broadcast by plane
Planted population: 26,500 seeds/acre	

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	3.5	12.6	13.2	47.5	15.5	55.8	10.8	38.9	194
2	2.6	9.4	3.3	11.9	2.7	9.7	2.4	8.6	50
3	3.2	11.5	3.2	11.5	5.0	18.0	3.1	11.2	65
4	17.2	61.9	55.1	198.4	38.3	137.9	11.4	41.0	549
5	4.7	16.9	14.1	50.8	18.3	65.9	7.6	27.4	201
6	2.1	7.6	2.3	8.3	9.7	34.9	12.3	44.3	119

Yield goal: 175
 N required for yield goal: 233
 Pounds N/acre from soil: 126
 Pounds N/acre from water: 0
 Pounds N/acre from legumes: 0
 Recommended rate N/acre: 107

General Fertility
 pH 6.8
 P 15
 K 393
 OM 1.4
 Zn 0.7

*Site 4 was not used because it was uncharacteristic of the rest of the field.

1990 Plot Yields

Row length (ft):	1263		<u>N Rate (lbs)</u>
Row width (ft):	2.5	Treatment 1	60
No. rows:	6	Treatment 2	110
Harvest date:	10-10-90	Treatment 3	160
No. acres:	40		

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.435	110	56.0	4330	21.6	4017	165.0
102	0.435	60	56.0	4355	22.1	4015	164.8
103	0.435	160	56.5	4290	21.9	3965	162.8
201	0.435	160	57.0	4500	20.7	4223	173.4
202	0.435	60	56.0	4285	20.1	4052	166.4
203	0.435	110	56.5	4520	20.7	4242	174.2
301	0.435	60	57.0	4355	22.1	4015	164.8
302	0.435	160	57.0	4430	21.4	4121	169.2
303	0.435	110	56.5	4225	21.4	3930	161.4
401	0.435	60	56.5	4275	21.3	3982	163.5
402	0.435	110	57.5	4280	21.1	3996	164.1
403	0.435	160	55.5	4605	21.6	4273	175.4

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	60	164.9	166.4	163.5	56.4	21.4
No. 2	110	166.1	174.2	161.4	56.6	21.2
No. 3	160	170.2	175.4	162.8	56.5	21.4
C.V.%		2.4				

PLOT INFORMATION: Chris Erickson Site

Site 2 was located on the Chris Erickson Farm north of Holdrege, NE. in Phelps County. The soil type was Holdrege silt loam 0-1% slope.

Plot strips were twelve rows wide, the length of the field. The three treatments were replicated four times and applied by the cooperater.

Preceding Crop:	corn	Starter applied	none
Preplant soil preparation:	shred stalks, deep chiseled, ridge tilled	Nitrogen application method:	replant anhydrous ammonia
Planting date:	April 25, 1990	Herbicide applied:	4 pt Lariat banded at planting, 0.76 oz Beacon by drop nozzles
Hybrid planted:	Pioneer 3180	Insecticide applied:	1.5 pt Penncap-M by plane
Planted population:	30,000 seeds/acre		

SOIL SAMPLING NITROGEN WORKSHEET

Trt	Area	Depth								Total # n/a
		0"-12"		13"-24"		25"-36"		37"-48"		
		ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
120	T	3.5	12.6	4.3	15.5	12.2	43.9	12.2	43.9	144.9
120	B	8.7	31.3	24.6	88.6	16.7	60.1	17.8	64.1	305.1
170	B	4.1	14.8	10.6	38.2	7.5	27.0	9.2	33.1	141.3
170	T	4.5	16.2	2.8	10.1	1.7	6.1	1.3	4.7	46.4
220	T	6.9	24.8	2.8	10.1	3.1	11.2	3.8	13.7	74.7
220	B	5.6	20.2	9.3	33.5	12.3	44.3	3.5	12.6	138.2
170	B	2.9	10.4	2.5	9.0	1.6	5.8	1.5	5.4	38.3
170	T	5.6	20.2	2.5	9.0	2.3	8.3	1.8	6.5	54.9
120	T	4.9	17.6	2.9	10.4	2.7	9.7	3.1	11.2	61.2
120	B	4.5	16.2	3.6	13.0	3.4	12.2	8.0	28.8	87.8
220	B	17.0	61.2	35.5	127.8	0.7	2.5	5.0	18.0	261.9
220	T	7.5	27.0	6.1	22.0	5.3	19.1	6.7	24.1	115.2
120	T	5.9	21.2	3.9	14.0	2.2	7.9	2.6	9.4	65.7
120	B	7.3	26.3	10.4	37.4	0.9	3.2	2.1	7.6	93.2
220	B	16.2	58.3	10.7	38.5	3.1	11.2	3.7	13.3	151.7
220	T	5.3	19.1	5.6	20.2	4.3	15.5	3.0	10.8	81.9
170	T	3.9	14.0	2.3	8.3	0.8	2.9	3.6	13.0	47.7
170	B	11.1	40.0	9.7	34.9	2.2	7.9	8.8	31.7	143.1
170	B	4.0	14.4	2.2	7.9	0.8	2.9	1.6	5.8	38.7
170	T	7.2	25.9	10.1	36.4	6.4	23.0	7.5	27.0	140.4
220	T	4.0	14.4	2.7	9.7	5.7	20.5	13.6	49.0	117.0
220	B	3.8	13.7	6.9	24.8	3.9	14.0	1.8	6.5	73.8
120	B	2.8	10.1	5.9	21.2	2.2	7.9	1.8	6.5	57.2
120	T	4.7	16.9	4.3	15.5	7.0	25.2	1.0	3.6	76.5

Yield Goal: 175
 N required for yield goal: 233
 Pounds N/acre from soil: 81
 Pounds N/acre from water: 20
 Recommended rate N/acre: 132

Residual Averages:
 Low Rate 111
 Rec Rate 81
 High Rate 127

This site is a repeat site from the 1989 South Central Nitrogen Management Project. Field sampling was performed by probing the top and bottom end of each of last year's strips. This tells us the amount of residual nitrogen remaining in the soil corresponding to the treatment applied.

1990 Plot Yields

Row length (ft): 1136
 Row width (ft): 3
 No. rows: 6
 Harvest date: 10-18-90
 No. acres: 70 under well

N Rate (lbs)
 Treatment 1 82
 Treatment 2 132
 Treatment 3 182

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.469	82	56.5	4225	19.1	4045	153.9
102	0.469	132	56.0	4410	19.4	4206	160.0
103	0.469	182	55.5	4040	19.8	3834	145.9
201	0.469	132	56.0	4100	18.6	3950	150.2
202	0.469	82	55.5	4040	19.2	3863	147.0
203	0.469	182	55.5	4040	18.7	3887	147.9
301	0.469	82	55.5	3830	18.6	3689	140.4
302	0.469	182	55.5	3835	18.4	3703	140.9
303	0.469	132	55.5	3940	18.9	3781	143.8
401	0.469	132	55.0	3790	18.3	3664	139.4
402	0.469	182	55.0	3650	18.1	3538	134.6
403	0.469	82	55.0	3770	18.3	3645	138.7

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	82	145.0	153.9	138.7	55.6	18.8
No. 2	132	148.4	160.0	139.4	55.6	18.8
No. 3	182	142.3	147.9	134.6	55.4	18.8
C.V.%		2.1				

PLOT INFORMATION: Stan Hansen Site

Site 3 was located on the Stan Hansen farm northwest of Wilcox, NE. in Phelps County. The soil type was Holdrege silt loam 0-1% slope.

Plot strips were sixteen rows wide, the length of the field. The three treatments were replicated four times and applied by the cooperater.

Preceding Crop: soybeans	Starter applied: none
Preplant soil preparation: disked twice, ripped in fall 1989	Nitrogen application method: preplant anhydrous ammonia
Planting date: April 29, 1990	Herbicide applied: 1 lb Bullet banded at planting
Hybrid planted: DeKalb DK 656	Insecticide applied: 1.5 pt Pennacap-M by plane
Planted population: 26,000 seeds/acre	

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	1.7	6.1	2.0	7.2	1.1	4.0	1.5	5.4	28
2	1.8	6.5	1.0	3.6	0.7	2.5	0.8	2.9	19
3	3.2	11.5	1.5	5.4	1.9	6.8	1.4	5.0	36
4	4.3	15.5	4.8	17.3	1.0	3.6	1.1	4.0	50
5	3.4	12.2	2.3	8.3	1.2	4.3	1.2	4.3	36
6	1.7	6.1	1.0	3.6	0.8	2.9	1.9	6.8	24

Yield goal: 170
 N required for yield goal: 227
 Lbs N/acre from soil: 32
 Lbs N/acre from water: 0
 Lbs N/acre from legumes: 50
 Recommended rate N/acre: 145

General Fertility
 pH 6.2
 P 15
 K 375
 OM 1.5
 Zn 0.5

1990 Plot Yields

Row length (ft): Varied
 Row width (ft): 2.5
 No. rows: 12
 Harvest date: 10-30-90
 No. acres: 40

N Rate(lbs)
 Treatment 1 100
 Treatment 2 150
 Treatment 3 200

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.737	150	57.0	7040	16.8	6932	168.0
102	0.751	100	57.0	7635	17.1	7490	178.1
103	0.768	200	57.0	7745	17.0	7608	176.9
201	0.785	200	57.0	7575	17.2	7423	168.8
202	0.799	100	57.0	7620	17.2	7467	166.9
203	0.809	150	57.0	7700	17.1	7554	166.7
301	0.820	100	56.5	8300	17.4	8113	176.7
302	0.826	200	57.0	8420	17.3	8241	178.2
303	0.826	150	57.0	8685	17.1	8521	184.2
401	0.833	100	56.5	8590	17.2	8417	180.4
402	0.840	150	56.5	8605	17.2	8432	179.2
403	0.847	200	57.0	9000	16.7	8872	187.1

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	100	175.5	180.4	166.9	56.8	17.2
No. 2	150	174.5	184.2	166.7	56.9	17.1
No. 3	200	177.7	187.1	168.8	57.0	17.1
C.V.%		2.4				

PLOT INFORMATION: Dean Casper Site

Site 6 was located on the Dean Casper farm north and east of Hildreth, NE. in Kearney County. The soil type was Holdrege/Detroit silt loam 0-1% slope.

Plot strips were six rows wide, the length of the field. The three treatments were replicated four times and applied by the cooperater. Surge irrigation was used on this field for the first time, in 1990.

Preceding Crop: Corn	Starter applied: none
Preplant soil preparation: Ridge tilled	Nitrogen applied: preplant anhydrous ammonia
Planting date: April 26, 1990	Herbicide applied: 3 qt Lariat
Hybrid planted: Pioneer 3379	Insecticide applied: Furadan at cultivation
Planted population: 27,000 seeds/acre	

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	1.7	6.1	2.4	8.6	2.2	7.9	1.5	5.4	35
2	3.8	13.7	6.1	22.0	9.4	33.8	7.8	28.1	122
3	7.3	26.3	17.1	61.6	10.1	36.4	6.2	22.3	183
4	6.9	24.8	15.6	56.2	13.6	49.0	8.2	29.5	199
5	4.0	14.4	5.5	19.8	2.8	10.1	1.7	6.1	63
6	3.4	12.2	2.4	8.6	3.5	12.6	4.0	14.4	60

Yield goal: 175
 N required for yield goal: 233
 Pounds N/acre from soil: 110
 Pounds N/acre from water: 0
 Pounds N/acre from legumes: 0
 Recommended rate N/acre: 123

General Fertility
 pH 6.4
 P 38
 K 510
 OM 1.3
 Zn 0.7

1990 Plot Yields

Row length (ft):	1236					<u>N Rate (lbs)</u>
Row width (ft):	3		Treatment 1			75
No. rows:	5		Treatment 2			125
Harvest date:	10-16-90		Treatment 3			175
No. acres:	55					

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.426	125	56.0	4065	18.3	3930	164.9
102	0.426	75	55.5	3660	17.8	3560	149.4
103	0.426	175	56.0	4215	18.3	4075	171.0
201	0.426	175	56.0	4370	18.5	4215	176.8
202	0.426	75	56.0	3725	18.0	3615	151.7
203	0.426	125	56.0	4305	18.4	4157	174.4
301	0.426	75	56.5	3830	18.1	3712	155.7
302	0.426	175	56.5	4295	18.3	4153	174.2
303	0.426	125	56.0	4165	18.4	4022	168.7
401	0.426	75	56.0	3350	17.8	3259	136.7
402	0.426	125	56.0	3705	18.3	3582	150.3
403	0.426	175	56.0	4170	18.4	4027	169.0

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	75	148.4	155.7	136.7	56.0	17.9
No. 2	125	164.6	174.4	150.3	56.0	18.4
No. 3	175	172.7	176.8	169.0	56.1	18.4
C.V.%		2.6				

PLOT INFORMATION: John Jelken Site

Site 8 was located on the John Jelken farm south and east of Hildreth, NE. in Franklin County. The soil type was Holdrege silt loam 0-1% slope.

Plot strips were twenty rows wide, the length of the field. The three treatments were replicated three times and were applied by Valco Inc. of Franklin.

Preceding Crop: corn	Starter applied: none
Preplant soil preparation: shred stalks, split ridges	Nitrogen application method: applied UAN solution with floater after planting
Planting date: April 30, 1990	Herbicide applied: 2.4 lbs Atrazine pre emergence
Hybrid planted: NC+ 5990	Insecticide applied: 5 lbs Furadan at cultivation, 2 pt Pennacap-M by plane
Planted population: 27,500 seeds/acre	

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	2.0	7.2	3.0	10.8	2.0	7.2	1.0	3.6	36
2	2.0	7.2	3.0	10.8	3.0	10.8	1.0	3.6	41
3	1.0	3.6	2.0	7.2	2.0	7.2	3.0	10.8	36
4	3.0	10.8	10.0	36.0	9.0	32.4	8.0	28.8	135
5	3.0	10.8	3.0	10.8	3.0	10.8	2.0	7.2	50
6	2.0	7.2	3.0	10.8	6.0	21.6	5.0	18.0	72

N required for yield goal: 215	General Fertility
Pounds N/acre from soil: 47	pH 6.1
Pounds N/acre from water: 0	P 25
Pounds N/acre from legumes: 0	K 472
Recommended rate N/acre: 168	OM 2.0
	Zn 3.1

* Site 4 was not used because it was uncharacteristic of the rest of the field.

1990 Plot Yields

Row length (ft): 690
 Row width (ft): 3
 No. rows: 5
 Harvest date: 10-18-90
 No. acres: 13

N Rate (lbs)
 Treatment 1 120
 Treatment 2 170
 Treatment 3 220

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.238	170	57.0	2505	18.3	2422	182.0
102	0.238	120	57.0	2540	18.6	2447	183.9
103	0.238	220	57.0	2465	18.5	2377	178.7
201	0.238	220	57.0	2430	18.0	2358	177.2
202	0.238	120	56.5	2530	18.7	2434	182.9
203	0.238	170	57.0	2605	18.6	2509	188.6
301	0.238	120	57.0	2520	18.1	2442	183.6
302	0.238	220	57.0	2350	17.6	2292	172.2
303	0.238	170	57.0	2550	17.9	2478	186.2

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	120	183.5	183.9	182.9	56.8	18.5
No. 2	170	185.6	188.6	182.0	57.0	18.3
No. 3	220	176.0	178.7	172.2	57.0	18.0
C.V.%		1.8				

PLOT INFORMATION: Milton Ruhter Site

Site 9 was located on the Milton Ruhter farm south of Prosser, NE in Adams County. The soil type is a Hord silt loam with a 0-1 percent slope.

Plot strips were eight rows wide the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Preceding Crop:
soybeans
Preplant soil preparation:
disk once, spring tooth once
Planting date:
May 8, 1990
Hybrid planted:
Ohlde 220
Planted population:
29,600 seeds/acre

Starter applied:
12 ga 9-22-5-6 2x2 placement
10 gal 28-0-0 in 12-inch band
Nitrogen application method:
sidedress anhydrous ammonia
Herbicide applied:
1 quart Bicep in a 12-inch band
Insecticide applied:
5 pounds Dipel at hilling

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	2.5	9.0	2.4	8.6	2.1	7.6	2.9	10.4	45
2	3.2	11.5	9.1	32.8	4.5	16.2	3.8	13.7	93
3	2.5	9.0	2.0	7.2	2.0	7.2	1.9	6.8	38
4	3.3	11.9	2.6	9.4	2.6	9.4	2.0	7.2	47
5	2.5	9.0	2.5	9.0	3.8	13.7	3.1	11.2	54
6	2.2	7.9	1.7	6.1	1.5	5.4	1.1	4.0	29

Yield goal: 180
N required for yield goal: 239
Pounds N/acre from soil: 51
Pounds N/acre from water: 0
Pounds N/acre from legumes: 50
Recommended rate N/acre: 138

General Fertility
pH 6.4
P 28
K 318
OM 1.0
Zn 10.9

1990 PLOT YIELDS

Row length (ft): 1869
 Row width (ft): 3
 No. rows: 6
 Harvest date: 10-15-90
 No. Acres: 40

N Rate (lbs)
 Treatment 1 90
 Treatment 2 140
 Treatment 3 190

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.772	140	57.0	7555	18.3	7305	168.9
102	0.772	90	56.0	7845	18.7	7548	174.5
103	0.772	190	56.5	7955	18.4	7682	177.6
201	0.772	190	56.5	8050	18.8	7736	178.9
202	0.772	90	56.0	7900	18.5	7620	176.2
203	0.772	140	57.0	7775	18.4	7508	173.6
301	0.772	90	56.5	7725	18.5	7451	172.3
302	0.772	190	56.5	7775	18.6	7490	173.2
303	0.772	140	56.0	7775	18.6	7490	173.2
401	0.772	90	56.5	7790	18.7	7495	173.3
402	0.772	140	56.5	7800	18.6	7514	173.7
403	0.772	190	56.0	7940	18.4	7668	177.3

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	90	174.1	176.2	172.3	56.3	18.6
No. 2	140	172.4	173.7	168.9	56.6	18.5
No. 3	190	176.7	178.9	173.2	56.1	18.6
C.V.%		1.2				

PLOT INFORMATION: CURT CARLSON SITE

Site 10 was located on the Curt Carlson farm south and west of Marquette, NE. in Hamilton County. The soil type was Holder silt loam 0-1% slope. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperator. Surge irrigation was used at this site for the first time, in 1990.

Preceding crop:
corn

Preplant soil preparation:
shred stalks, ridge tilled

Planting date:
April 27, 1990

Hybrid planted:
Northrup King 8625

Planted population:
27,000 seeds/acre

Starter applied:
5 Gal 10-34-0

Nitrogen application method:
preplant anhydrous ammonia

Herbicide applied:
1 qt Lariat + .5 qt Atrazine

Insecticide applied:
8.7 lbs Counter at planting, 3.5
lbs Dipel at cultivation, 1.5 Pt
Furadan by plane

SOIL SAMPLING NITROGEN WORKSHEET

		Depth								
Trt	Area	0"-12"		13"-24"		25"-36"		37"-48"		Total
		ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	#n/a
150	T	1.7	6.1	0.7	2.5	0.5	1.8	0.4	1.4	14.0
150	B	1.2	4.3	1.2	4.3	0.6	2.2	0.6	2.2	16.2
200	B	3.9	14.0	2.2	7.9	1.0	3.6	0.6	2.2	34.6
200	T	0.6	2.2	0.4	1.4	0.4	1.4	0.4	1.4	8.1
250	T	3.6	13.0	2.2	7.9	0.9	3.2	0.4	1.4	32.0
250	B	3.1	11.2	5.8	20.9	3.0	10.8	1.4	5.0	59.8
200	B	0.4	1.4	1.0	3.6	0.5	1.8	0.4	1.4	10.3
200	T	3.2	11.5	1.8	6.5	2.5	9.0	1.9	6.8	42.3
150	T	0.8	2.9	0.5	1.8	0.4	1.4	0.4	1.4	9.4
150	B	1.0	3.6	0.7	2.5	0.5	1.8	0.4	1.4	11.7
250	B	6.1	22.0	2.8	10.1	0.7	2.5	1.2	4.3	48.6
250	T	2.0	7.2	3.0	10.8	2.5	9.0	0.7	2.5	36.9
150	T	1.7	6.1	0.6	2.2	0.4	1.4	0.5	1.8	14.4
150	B	3.2	11.5	1.1	4.0	0.7	2.5	0.6	2.2	25.2
250	B	1.2	4.3	0.9	3.2	0.5	1.8	0.5	1.8	13.9
250	T	0.6	2.2	1.1	4.0	0.5	1.8	0.4	1.4	11.7
200	T	5.4	19.4	1.4	5.0	0.9	3.2	0.4	1.4	36.5
200	B	7.1	25.6	12.0	43.2	5.9	21.2	3.0	10.8	126.0
250	B	8.1	29.2	17.7	63.7	3.8	13.7	1.9	6.8	141.7
250	T	1.9	6.8	0.5	1.8	0.3	1.1	0.4	1.4	13.9
200	T	2.2	7.9	0.4	1.4	0.4	1.4	0.3	1.1	14.9
200	B	1.5	5.4	0.9	3.2	0.7	2.5	0.5	1.8	16.2
150	B	7.4	26.6	8.6	31.0	2.9	10.4	2.3	8.3	95.4
150	T	1.7	6.1	0.5	1.8	0.3	1.1	0.4	1.4	13.1

Yield goal: 200
 N required for yield goal: 264
 Pounds N/acre from soil: 36
 Pounds N/acre from water: 10
 Recommended rate N/acre: 218

Residual Averages:
 Low Rate 25
 Rec Rate 36
 High Rate 45

This site is a repeat site from the 1989 South Central Nitrogen Management Project. Field sampling was performed by probing the top and bottom end of each of last years strips. This tells us the amount of residual nitrogen remaining in the soil corresponding to the treatment applied.

1990 Plot Yields

Plot location: Curt Carlson
 Row length (ft): 1640
 Row width (ft): 2.5
 No. rows: 8
 Harvest date: 10-17-90
 No. acres: 75 under well

N Rate (lbs)
 Treatment 1 168
 Treatment 2 218
 Treatment 3 268

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.753	168	58.0	9010	19.2	8615	204.3
102	0.753	218	58.5	9075	19.5	8645	205.0
103	0.753	268	58.0	9080	19.0	8704	206.4
201	0.753	218	58.0	9070	19.6	8630	204.7
202	0.753	168	58.0	9020	19.7	8572	203.3
203	0.753	268	58.0	8990	19.4	8575	203.4
301	0.753	168	58.0	9125	19.8	8661	205.4
302	0.753	268	58.0	9240	18.9	8868	210.3
303	0.753	218	58.0	8980	19.4	8566	203.1
401	0.753	268	58.0	9055	19.3	8648	205.1
402	0.753	218	58.5	8890	19.0	8522	202.1
403	0.753	168	58.0	8960	19.2	8568	203.2

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	168	204.0	205.4	203.2	58.0	19.5
No. 2	218	203.7	205.0	202.1	58.0	19.4
No. 3	268	206.3	210.3	203.4	58.0	19.2
C.V.%		.9				

PLOT INFORMATION: Joel Anderson Site

Site 11 was located on the Joel Anderson farm southwest of Polk, NE in Hamilton County. The soil type was Holder silt loam 0-1 % slope.

Plot strips were six rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperator.

Preceding Crop: corn	Starter applied: none
Preplant soil preparation: ridge tilled	Nitrogen application method: preplant anhydrous ammonia
Planting date: April 29, 1990	Herbicide applied: Atrazine
Hybrid planted: Pioneer 3180	Insecticide applied: Dyfonate
Planted population: 27,000 seeds/acre	

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	1.4	5.0	2.2	7.9	1.2	4.3	1.2	4.3	27
2	2.4	8.6	2.7	9.7	2.3	8.3	4.7	16.9	54
3	2.6	9.4	4.2	15.1	5.3	19.1	6.2	22.3	82
4	1.3	4.7	7.1	25.6	2.3	8.3	1.6	5.8	55
5	1.6	5.8	1.3	4.7	1.3	4.7	0.5	1.8	21
6	2.3	8.3	3.6	13.0	4.7	16.9	2.4	8.6	59

Yield goal: 170
 N required for yield goal: 227
 Pounds N/acre from soil: 50
 Pounds N/acre from water: 20
 Pounds N/acre from legumes: 0
 Recommended rate N/acre: 157

General Fertility:
 pH 6.7
 P 25
 K 402
 OM 1.7
 Zn 0.8

1990 Plot Yields

Row length (ft): 2476
 Row width (ft): 3
 No. rows: 6
 Harvest date: 10-26-90
 No. acres: 80

N Rate (lbs)
 Treatment 1 110
 Treatment 2 160
 Treatment 3 210

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	1.023	160	56.0	8605	13.7	8788	153.4
102	1.023	110	56.0	8210	13.7	8385	146.3
103	1.023	210	56.0	8330	13.9	8488	148.1
201	1.023	210	56.0	8290	13.8	8457	147.6
202	1.023	110	55.5	8445	13.1	8685	151.6
203	1.023	160	56.0	8375	13.3	8593	150.0
301	1.023	110	56.0	8360	13.0	8607	150.2
302	1.023	210	56.0	8180	13.4	8383	146.3
303	1.023	160	56.0	8425	13.2	8654	151.0
401	1.023	110	56.0	8380	13.5	8578	149.7
402	1.023	160	56.0	7980	13.4	8178	142.7
403	1.023	210	56.0	8125	13.4	8327	145.3

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	110	149.5	151.6	146.3	55.9	13.4
No. 2	160	149.3	153.4	142.7	56.0	13.4
No. 3	210	146.8	148.1	145.3	56.0	13.6
C.V%		2.1				

PLOT INFORMATION: MARK NEWCOMER SITE

Site 12 was located on the Mark Newcomer farm south and east of Stromsburg, NE. in Polk County. The soil type was Hastings silt loam 0-1% slope.

Plot strips were fourteen rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperator. Surge irrigation was used on this site.

Preceding Crop: corn	Starter applied: none
Preplant soil preparation: shred stalks, ridge tilled	Nitrogen application method: sidedress anhydrous ammonia
Planting date: April 26, 1990	Herbicide applied: Ramrod + Atrazine banded
Hybrid planted: Jacques 8210	Insecticide applied: 7 lbs Counter at cultivation, 4 lbs Dipel at hilling time
Planted population: 26,000 seeds/acre	

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	2.6	9.4	1.5	5.4	1.1	4.0	1.0	3.6	28
2	2.1	7.6	2.0	7.2	2.7	9.7	1.9	6.8	39
3	2.3	8.3	2.1	7.6	1.6	5.8	1.0	3.6	32
4	3.5	12.6	1.3	4.7	0.9	3.2	0.9	3.2	30
5	2.5	9.0	1.5	5.4	0.7	2.5	0.5	1.8	23
6	2.4	8.6	1.3	4.7	0.4	1.4	0.4	1.4	20

Yield goal: 175
 N required for yield goal: 233
 Pounds N/acre from soil: 29
 Pounds N/acre from water: 9
 Pounds N/acre from legumes: 0
 Recommended rate N/acre: 195

General Fertility
 pH 6.3
 P 25
 K 491
 OM 1.8
 Zn 1.1

1990 Plot Yields

Row length (ft):	Varied		
Row width (ft):	3	Treatment 1	N Rate (lbs) 145
No. rows:	8	Treatment 2	195
Harvest date:	10-11-90	Treatment 3	225
No. acres:	22		

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.341	195	58.0	3815	21.8	3531	184.9
102	0.348	145	58.0	3935	22.6	3604	185.0
103	0.355	225	57.5	4060	22.3	3733	187.8
201	0.363	225	56.5	4180	22.9	3814	187.6
202	0.366	145	56.5	4160	22.1	3835	187.1
203	0.372	195	56.0	4290	21.3	3996	191.8
301	0.375	145	57.0	4225	21.6	3920	186.7
302	0.377	225	56.5	4210	21.6	3906	185.0
303	0.380	195	56.5	4170	21.9	3854	181.1
401	0.384	145	56.5	4160	21.3	3874	180.2
402	0.384	195	56.0	4205	21.8	3891	181.0
403	0.384	225	56.5	4135	21.7	3832	178.2

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	145	184.7	187.1	180.2	57.0	21.9
No. 2	195	184.7	191.8	181.0	56.6	21.7
No. 3	225	184.7	187.8	178.2	56.8	22.1
C.V.%		1.5				

PLOT INFORMATION: Brad Rathje Site

Site 13 was located on the Brad Rathje farm west of Waco, NE. in York County. The soil type was Hastings silt loam 0-1% slope.

Plot strips were twelve rows wide, the length of the field. The three treatments were replicated four times and applied by the coopererator.

Preceding Crop:
corn

Preplant soil preparation:
disked

Planting date:
April 28, 1990

Hybrid planted:
Funks 4543

Planted population:
26,500 seeds/acre

Starter applied:

6.6 lbs N, 19.8 lbs P, 1.3 lbs S, .3 lbs Zn

Nitrogen application method:

sidedress 28 % UAN solution

Herbicide applied:

.6 pt Dual, 1 pt Atrazine

Insecticide applied:

6.8 lbs Furadan at cultivation

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	1.7	6.1	1.0	3.6	0.6	2.2	0.4	1.4	17
2	10.9	39.2	3.0	10.8	2.0	7.2	1.2	4.3	77
3	7.5	27.0	2.4	8.6	1.4	5.0	1.2	4.3	56
4	5.1	18.4	4.0	14.4	1.9	6.8	0.9	3.2	54
5	1.2	4.3	0.7	2.5	0.5	1.8	0.5	1.8	13
6	22.5	81.0	3.1	11.2	1.9	6.8	2.4	8.6	135

Yield goal: 170
N required for yield goal: 227
Pounds N/acre from soil: 43
Pounds N/acre from water: 0
Pounds N/acre from legumes: 0
Recommended rate N/acre: 184

General Fertility

pH 6.2
P 11
K 204
OM 1.8
Zn 1.1

*Site 6 was not used because it was uncharacteristic of the rest of the field.

1990 Plot Yields

Row length (ft): 993
 Row width (ft): 3
 No. rows: 12
 Harvest date: 10-19-90
 No. acres: 70

N Rate (lbs)
 Treatment 1 135
 Treatment 2 185
 Treatment 3 235

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist	Adj Weight	Yield
101	0.821	185	58.0	9340	18.7	8986	195.5
102	0.821	135	57.5	9215	18.9	8844	192.4
103	0.821	235	57.5	9345	18.5	9013	196.1
201	0.821	235	57.0	9430	18.7	9073	197.4
202	0.821	135	57.0	9155	19.0	8776	191.0
203	0.821	185	57.0	9090	18.6	8757	190.5
301	0.821	135	57.0	9100	18.7	8755	190.5
302	0.821	235	57.0	9270	19.1	8875	193.1
303	0.821	185	57.0	9170	18.7	8823	192.0
401	0.821	135	57.0	8975	18.8	8624	187.7
402	0.821	185	57.0	9130	18.7	8784	191.1
403	0.821	235	57.0	9160	18.8	8802	191.5

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	135	190.4	192.4	187.7	57.1	18.9
No. 2	185	192.3	195.5	190.5	57.3	18.7
No. 3	235	194.5	197.4	191.5	57.1	18.8
C.V.%		.8				

PLOT INFORMATION: DOUG CAST SITE

Site 14 was located on the Doug Cast farm south of Utica, NE. in Seward County. The soil type was Butler/Fillmore silt loam 0-1% slope.

Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Preceding Crop:
corn

Preplant soil preparation:
shred stalks, ridge tilled

Planting date:
April 25, 1990

Hybrid planted:
NC+ 4616

Planted population:
24,600 seeds/acre

Starter applied:

5 gal 10-34-0 in furrow

Nitrogen application method:
preplant anhydrous ammonia

Herbicide applied:
3.5 pt Marksman broadcast

Insecticide applied:
8 lbs Thimet with cultivator,
3.2 oz./acre Asana

SOIL SAMPLING NITROGEN WORKSHEET

Site	Depth								Total # n/a
	0"-12"		13"-24"		25"-36"		37"-48"		
	ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
1	3.7	13.3	2.0	7.2	1.3	4.7	1.2	4.3	37
2	3.0	10.8	1.9	6.8	1.6	5.8	1.1	4.0	34
3	2.5	9.0	1.5	5.4	1.1	4.0	0.9	3.2	27
4	2.7	9.7	2.0	7.2	1.1	4.0	1.0	3.6	31
5	2.7	9.7	2.8	10.1	1.2	4.3	0.8	2.9	34
6	3.9	14.0	1.8	6.5	1.0	3.6	0.9	3.2	34

Yield goal: 160
N required for yield goal: 215
Pounds N/acre from soil: 33
Pounds N/acre from water: 0
Pounds N/acre from legumes: 0
Recommended rate N/acre: 182

General Fertility

pH 6.2
P 34
K 371
OM 2.3
Zn 1.8

1990 Plot Yields

Row length (ft):	Varied		<u>N Rate (lbs)</u>
Row width (ft):	2.5	Treatment 1	130
No. rows:	8	Treatment 2	180
Harvest date:	10-12-90	Treatment 3	230
No. acres:	80		

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.847	180	57.0	7230	16.3	7162	151.0
102	0.847	130	56.0	7005	15.0	7046	148.6
103	0.847	230	57.0	7115	16.6	7022	148.1
201	0.847	230	57.0	7065	16.2	7006	147.7
202	0.847	130	56.5	7030	15.5	7030	148.2
203	0.847	180	57.0	7035	14.9	7085	149.4
301	1.075	130	57.0	8915	15.2	8947	148.6
302	1.075	230	57.0	9125	15.1	9168	152.3
303	1.075	180	57.0	8840	15.0	8892	147.7
401	1.075	130	58.0	8545	14.9	8606	143.0
402	1.075	180	57.5	8450	15.2	8480	140.9
403	1.075	230	57.0	8500	15.7	8480	140.9

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	130	147.1	148.6	143.0	56.9	15.2
No. 2	180	147.2	151.0	140.9	57.1	15.4
No. 3	230	147.2	152.3	140.9	57.0	15.9
C.V.%		1.1				

PLOT INFORMATION: Don Kottmeyer Site

Site 15 was located on the Don Kottmeyer farm east of Superior, NE in Nuckolls County. The soil type was Hord silt loam 0-1% slope.

Plot strips were ten rows wide, the length of the field. The three treatments were replicated three times and applied by Boettcher Enterprises of Superior.

Preceding Crop: corn	Starter applied: none
Preplant soil preparation: shred stalks, split ridges	Nitrogen application method: applied UAN solution with floater after planting
Planting date: May 5, 1990	Herbicide applied: Bicep
Hybrid planted Golden Harvest 2525	Insecticide applied: 5 lbs Dyfonate II banded
Planted population: 31,600 seeds/acre	

SOIL SAMPLING NITROGEN WORKSHEET

Trt	Area	Depth								Total # n/a
		0"-12"		13"-24"		25"-36"		37"-48"		
		ppm	#/a	ppm	#/a	ppm	#/a	ppm	#/a	
115	T	32.5	117.0	24.0	86.4	7.4	26.6	6.8	24.5	318.2
115	B	11.7	42.1	10.6	38.2	5.5	19.8	4.3	15.5	144.5
165	B	7.1	25.6	3.8	13.7	2.5	9.0	2.2	7.9	70.2
165	T	21.6	77.8	23.0	82.8	13.1	47.2	8.5	30.6	297.9
215	T	3.3	11.9	1.3	4.7	1.2	4.3	2.1	7.6	35.6
215	B	3.9	14.0	1.4	5.0	1.1	4.0	0.7	2.5	32.0
215	B	1.6	5.8	1.9	6.8	1.6	5.8	1.0	3.6	27.5
215	T	6.8	24.5	13.3	47.9	5.3	19.1	2.7	9.7	126.5
165	T	12.3	44.3	9.0	32.4	3.5	12.6	3.6	13.0	127.8
165	B	2.7	9.7	0.6	2.2	1.2	4.3	1.7	6.1	27.9
115	B	10.0	36.0	2.1	7.6	1.7	6.1	1.3	4.7	68.0
115	T	0.7	2.5	0.5	1.8	0.5	1.8	0.7	2.5	10.8
165	T	6.7	24.1	4.3	15.5	9.1	32.8	1.3	4.7	96.3
165	B	8.3	29.9	2.2	7.9	1.5	5.4	1.0	3.6	58.5
215	B	3.5	12.6	1.4	5.0	1.7	6.1	1.1	4.0	34.7
215	T	2.2	7.9	0.9	3.2	1.1	4.0	3.9	14.0	36.5
115	T	0.5	1.8	0.4	1.4	0.4	1.4	0.4	1.4	7.7
115	B	2.8	10.1	1.1	4.0	0.5	1.8	0.5	1.8	22.1
215	B	2.1	7.6	0.6	2.2	0.8	2.9	0.4	1.4	17.6
215	T	2.2	7.9	0.3	1.1	0.3	1.1	0.4	1.4	14.4
115	T	0.6	2.2	0.3	1.1	0.3	1.1	0.3	1.1	6.8
115	B	1.9	6.8	0.6	2.2	0.7	2.5	0.8	2.9	18.0
165	B	1.6	5.8	0.8	2.9	0.6	2.2	0.7	2.5	16.7
165	T	1.1	4.0	0.3	1.1	0.3	1.1	0.3	1.1	9.0

Yield goal: 160
 N required for yield goal: 215
 Pounds N/A from soil: 88
 Pounds N/A from water: 0
 Recommended rate N/A: 127

Residual Averages
 Low Rate 74
 Rec Rate 88
 High Rate 41

This site is a repeat site from the 1989 South Central Nitrogen Management Project. Field sampling was performed by probing the top and bottom end of each of last years strips. This tells us the amount of residual nitrogen remaining in the soil corresponding to the treatment applied.

1990 Plot Yields

Row length (ft): Varied
 Row width (ft): 3
 No. rows: 10
 Harvest date: 10-13-90
 No. acres: 17

N Rate (lbs)
 Treatment 1 80
 Treatment 2 130
 Treatment 3 180

Plot No.	Plot Acres	N Rate	Test Weight	Net Weight	% Moist.	Adj. Weight	Yield
101	0.430	80	56.5	3800	15.0	3822	158.7
102	0.437	130	56.0	4095	15.5	4095	167.3
103	0.444	180	56.0	4105	15.6	4100	164.9
201	0.450	180	55.5	3975	15.8	3961	157.2
202	0.457	130	56.0	3730	15.5	3730	145.7
203	0.463	80	56.0	3825	15.4	3830	147.7
301	0.469	130	56.5	3780	15.7	3771	143.6
302	0.475	180	55.5	3805	15.3	3814	143.4
303	0.482	80	56.0	3925	15.3	3934	145.8

<u>Treatment</u>	<u>N Rate</u>	<u>Yield</u>	<u>Max</u>	<u>Min</u>	<u>Test Wt</u>	<u>Moist</u>
No. 1	80	150.7	158.7	145.8	56.2	15.2
No. 2	130	152.2	167.3	143.6	56.2	15.6
No. 3	180	155.2	164.9	143.4	55.7	15.6
C.V.%		3.0				