

W A T E R



Q U A L I T Y

Mid-Nebraska Demonstration Project

1991

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

Study
305.1
UNI

Soil Conservation Service
University of Nebraska Cooperative Extension

SCREC 92\2

Under the leadership of the Soil Conservation Service and the University of Nebraska Cooperative Extension, the following agencies have provided financial and personnel assistance to make this project possible:

- Agricultural Stabilization and Conservation Service
- Upper Big Blue Natural Resources District
- Tri-Basin Natural Resources District
- Little Blue Natural Resources District
- Lower Republican Natural Resources District
- Blue River Association of Groundwater Districts
- UNL Conservation and Survey Division
- USDA Agricultural Research Service
- Nebraska Department of Environmental Control

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Study
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University of Nebraska Cooperative
Extension
FIELD DEMONSTRATIONS OF BEST
MANAGEMENT PRACTICES TO
PROTECT GROUNDWATER Quality

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Nebraska Rural Water Association
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Broadcast Media Association

State Department of Health
League of Municipalities
Center for Rural Affairs
Natural Resources Commission
Nebraska Press Association

Nebraska Corn Growers Association
Nebraska Sustainable Agricultural Society
Nebraska Association of Resources Districts
Nebraska Fertilizer & Ag-Chemical Institute
Nebraska Independent Crop Consultants Association
Nebraska Bankers Association

Mid-Nebraska Water Quality Demonstration Project

The Mid-Nebraska Water Quality Demonstration Project (MNWQDP) began in March, 1990 with the authorization of USDA funds from President Bush's Water Quality Initiative. One of eight projects selected nation-wide in 1990, the project has four objectives:

1. Foster the 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 the 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.

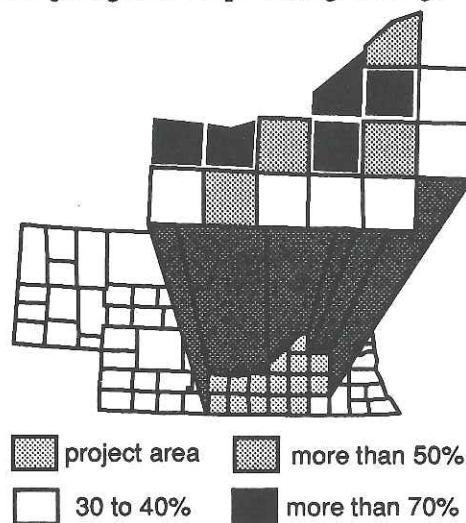
Project Description

The upland areas of central Nebraska, south of the Platte river, are characterized by medium to fine-textured loess soils that overlie groundwater that is 50- to 150-foot deep.

Groundwater is abundant in this south-central Plains region. Sand and gravel of Pliocene and Pleistocene age and the Ogallala Group of Miocene age in the west have yielded large quantities of quality groundwater. Nitrate-nitrogen movement under fine-textured soils such as this has not been perceived as an imminent threat to groundwater quality because of the relatively slow movement of water and nitrate in these soils and because of the depth to the aquifer.

There are 3.4 million acres of cultivated land in the 15-county area encompassed by the Mid-Nebraska Water Quality Demonstration Project (see map below). This area has been irrigated for more than 60 years and continuous corn production is the most common agricultural practice

Figure 1. MNWQDP project area, showing percent of irrigated cropland by county.



1989 NE Agricultural Statistics, NE Dep't of Ag.

on the majority of the irrigated acres. The investments made in irrigation capabilities and the USDA farm program provisions strongly influence cropping decisions in this area.

The 15-county project area encompasses some of the most productive corn-producing acres in Nebraska. While the area accounts for less than 22 percent of the cultivated acres in the state, it produces 35 percent of the corn and accounts for over 30 percent of the nitrogen fertilizer used.

Water Quality Problems _____

There is no critical widespread nitrate problem in the groundwater underlying the 15-county project area at this time, but the intensive, irrigated agricultural practices in south-central Nebraska create the potential for water quality problems. There is evidence from local, state and federal agencies' studies that groundwater nitrate levels are rising and a nitrate load does exist in the vadose zone.

Many research projects have documented the relationship between nitrogen application and nitrate load in the vadose zone. One study, done in 1988, showed the movement of nitrate to a depth of 60 feet over a 15-year period under excessively fertilized plots. The vadose-zone (that area between the root zone and the groundwater) nitrate load was documented on several farms in the area from 1986 through 1990.

This substantial amount of nitrate is at depths that deep-rooted crops cannot reach. Comparison studies have been done on pastures having no history of nitrogen fertilization. The results suggest that the

load is not natural, but has come from applied fertilizer.

The premise behind the Mid-Nebraska Project is that fertilizer and waste products are being applied in much of the project area in a manner that allows excessive amounts of unused nitrate to reside in the soil. Then, poorly timed and/or poorly distributed irrigation water (combined with rainfall) is carrying nitrate below the root zone. Records of residual nitrate in the root zone prior to fertilization for the next crop support the assumption of excess nitrogen application.

Pesticide contamination of the groundwater in this area is not widespread. The only pesticide found in the groundwater of this area with some regularity is atrazine.

The soils of this area have a medium to low leaching potential, according to Soil Conservation Service characterization. Computer models suggest that atrazine would not be expected to penetrate these soils to the groundwater. There is no current, conclusive evidence that atrazine in these wells is from a non-point source.

Best Management Practices Demonstrated _____

The Mid-Nebraska Water Quality Demonstration Project hopes to achieve its objectives through the use of demonstrated best management practices (BMP's).

Thirty-three irrigated-crop producers throughout the 15-county area have volunteered their land and time to establish sites that demonstrate the recommended best management practices for their locale and situation.

The practices to be demonstrated throughout the project area are:

1. Deep soil sampling and analysis to estimate available soil nitrogen.
2. Irrigation water testing to estimate the irrigation water nitrogen contribution.
3. Selecting realistic yield goals based on field history.
4. Irrigation scheduling to efficiently apply proper amounts of irrigation water.
5. The use of irrigation flow meters to accurately measure applied irrigation water.
6. The use of an integrated pest management (IPM) approach to minimize pesticide applications, and to optimize their efficiency when applied.
7. The use of irrigation surge valves to more uniformly apply irrigation water.
8. The use of delayed nitrogen application (sidedress and/or fertigation) to more efficiently use fertilizer nitrogen.
9. The use of nitrification inhibitors to delay nitrification, restrict leaching, and increase nitrogen use efficiency.
10. Allowing proper nutrient credits for preceding legume crops.
11. Allowing proper nutrient credits for manure, compost, sewage sludge and other waste products.
12. Application of manures and other waste products by methods to allow efficient use of nutrients contained in the products.
13. Minimizing irrigation water runoff through the use of proper land leveling, reuse basins, and surge valves.
14. The use of proper pesticide mixing and application procedures to prevent point-source contamination, either at the farmstead or in the field.
15. The use of crop rotations to reduce nitrogen fertilizer use and impact of insect and weed infestations.
16. The use of winter cover crops to retain residual soil nitrate between growing seasons.

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.

A local committee, made up of producers and agency and agribusiness representatives from that county, has input on 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.

Nitrogen Management Activities

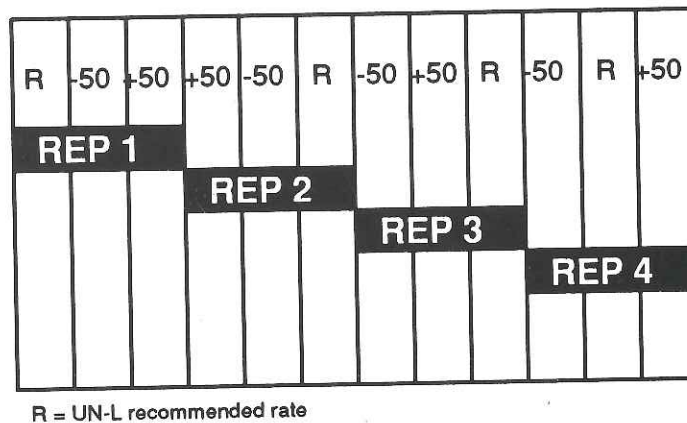
Common to most of the demonstration sites are field-length strips showing nitrogen management. Each strip is the width of the nitrogen fertilizer applicator; a minimum of eight rows wide. Each strip is under one treatment for the entire five-year's duration of the project.

The nitrogen treatments are developed using a University of Nebraska-Lincoln formula that includes the following factors:

- Yield goal equals the 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.

The nitrogen fertilizer is then applied in side-by-side comparison strips (see Figure 2). The strips include the 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.

Figure 2. Example of plot layout for nitrogen rate strips.



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 are based on the residual nitrate in the recommended-rate strips.

Irrigation Management Activities

Water management activities in a demonstration project are unlike nitrogen management activities in that replicated strip plots or trials are rarely possible. Statistically valid comparisons depicting the outcome or effect of practices are limited by land, labor, and time constraints, and are often severely confounded by the spatial variability of soil, water application, and topographic conditions.

The extent to which water management activities may be applied depends on the practices and conditions associated with each site. The activities promoted in this project are generally those which have had historically documented success, and have a high probability of success under the conditions of a given site.

The water management activities demonstrated in this project are:

1. proper irrigation scheduling methods
2. metering flows to reduce gross application
3. surge irrigation
4. irrigation systems alterations that reduce deep percolation
5. management strategies that encourage more effective water use.

In the water management activities of the MNWQDP, cooperators are encouraged to keep accurate and detailed information on their irrigation practices. This includes:

- Cooperators meter all irrigation applications and record rainfall amounts throughout the irrigation season.
- Cooperators are required to have access to an acceptable irrigation scheduling practice. The recommended irrigation scheduling methods include the checkbook (volume balance) method, appearance and feel techniques, the use of tensiometers, resistance blocks, or atmometers, computer based schedulers, or other advanced techniques. Day-to-day irrigation scheduling activi-

ties may be the responsibility of the cooperator, a commercial crop consultant, a project technologist, or an employee of a cooperating agency.

- Project personnel work closely with each cooperator to recommend different practices, or changes in existing practices, that have a high probability of enhancing the performance of the cooperator's irrigation system. Cooperators are presented with options that, if they so choose, may be implemented at their site. Project personnel then assist in the design, installation, operation and maintenance of the practices that the cooperator has designated, primarily in an advisory or technical assistance role.

A major principle associated with water management activities is that the wholesale adoption of historically proven practices can only result in positive changes in the interaction between on-farm water management and groundwater quality and quantity.

Pest Management Activities

Integrated pest management (IPM) is the basis for pest control at the demonstration sites. IPM is a program of pest control measures beyond simple pesticide treatments. One can expect a reduction in chemical uses over time using IPM practices which include, but are not limited to rotational cropping, the use of economic thresholds, biological controls, mechanical controls and chemical controls.

The key to IPM is field scouting. Regular methodical examinations of the demonstration fields alert operators to

potential pest problems. Using this information with known thresholds developed through university and private research, it is possible to determine the economic loss potential and assign some risk value to that potential. (See Figure 3 for an example of the economic threshold com-

Most sites are scouted by professional consultants. Project technologists scout several of the sites, and some sites are scouted by the producer/cooperator. European corn borer, rootworm and other insect treatments are based on field information and economic thresholds recom-

mended by the consultant. Weeds are also pests that are treated based on field information. Consultants scouted the demonstration fields as they would have scouted non-participating producer's fields.

Atrazine has been targeted for reduction since it is the primary herbicide found in Nebraska groundwater. Demonstration practices include control alternatives such as crop rotation, the 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 is also being emphasized.

Figure 3. Example of computer model for 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

puter program used on one site in 1990.) Decisions made on this basis will result in reduced chemical use compared to routine treatments or treatments based on unreasonably low thresholds.

W A T E R

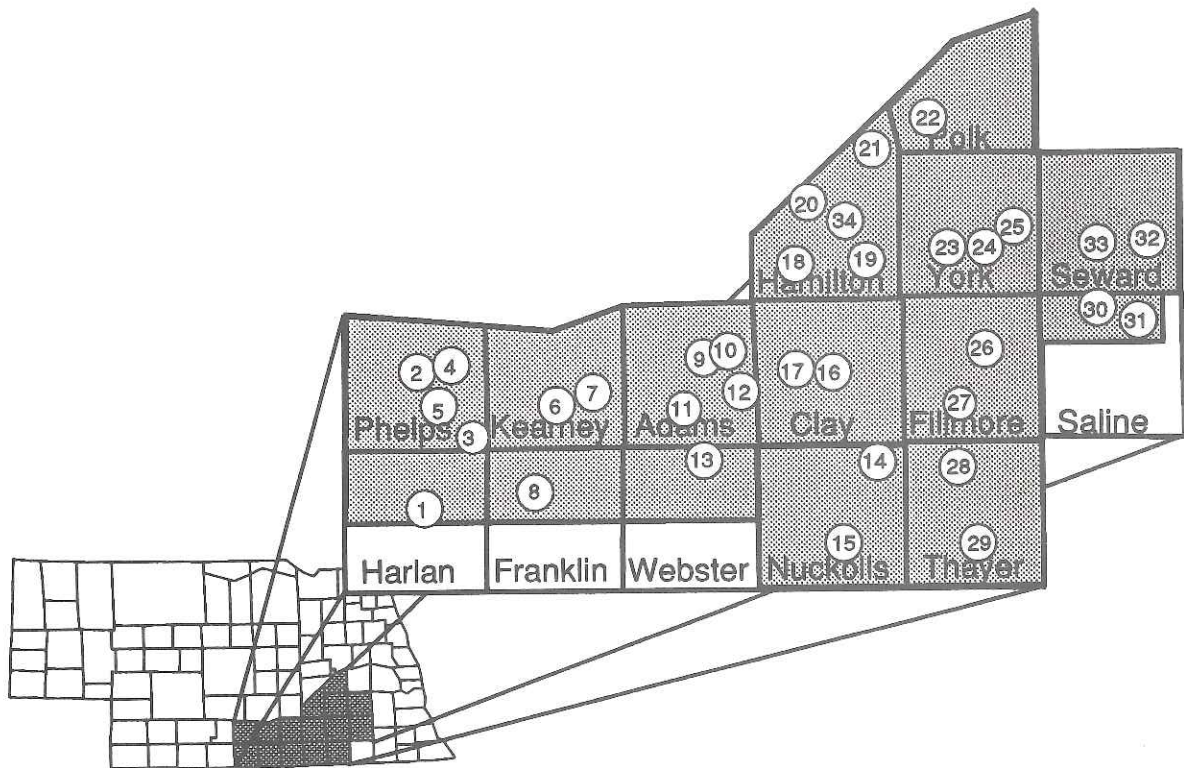


Q U A L I T Y

Mid-Nebraska Demonstration Project

South Central Research and Extension Center Box 66 Clay Center, NE 68933 (402)762-3535

The project staff would like to thank the following cooperators for participating in the project in 1991



- | | | | | |
|------------------|------------------------------------|--------------------|------------------------|--------------------|
| 1 Al Hollertz | 8 John Jelken | 14 Lale Oellerich | 21 Joel Anderson | 28 Leroy Voss |
| 2 Chris Erickson | 9 Milton Ruhter | 15 Don Kottmeyer | 22 Mark Newcomer | 29 Effenbeck Farms |
| 3 Stan Hansen | 10 Myles Ramsey/
William McLeod | 16 Steve Yost | 23 Jerry Stahr-pivot | 30 Keith Spohn |
| 4 Lloyd Erickson | 11 Larry Christensen | 17 Dave Hamburger | 24 Jerry Stahr-gravity | 31 Wayne Hansen |
| 5 Bruce Anderson | 12 Bruce Bohlen | 18 Clayton Higgins | 25 Brad Rathje | 32 Dean Rocker |
| 6 Dean Casper | 13 Kevin Karr | 19 Carey Friesen | 26 Howard Lefler | 33 Doug Cast |
| 7 Dave Nielsen | | 20 Curt Carlson | 27 Jim Bedlan | 34 The Grain Place |

* No. 34, The Grain Place, is an organic crop farm that is being monitored and used to demonstrate the effects of crop rotation, cover crops and other practices.

Summary of Results - 1991

Nitrogen Management

Twenty-six demonstration sites had nitrogen (N) fertilizer rate comparison strips in 1991. At the majority of these sites, N fertilizer was applied in replicated, field-length strips at the recommended N rate and rates 50 lb/acre above and below the recommended rate. The recommended rate was determined by following the University of Nebraska procedures, including credits for N available from soil, irrigation water, legumes, and manures.

Thirty-two of the sites had soil samples taken to a depth of four feet to determine residual soil nitrate levels. One site had legume credits for soybeans as the previous crop, and one site received credit for swine slurry manure applications. Since groundwater nitrate-N concentrations are relatively low in most of the project area, only nine sites had significant credit for nitrate in irrigation water.

The average yield goal for the twenty-six sites with N rate strips was 178 bu/

acre, with a range from 140 to 200 bu/acre. Figure 4 shows that most of the yield goals were realistic, bracketing the 1:1 line where actual yield equals yield goal.

Recommended N fertilizer rates for the sites ranged from 0 to 221 lb/acre, depending on yield goal and N credits. The average recommended N rate for the twenty-six sites was 137 lb/acre.

Reduction in N fertilizer rates averaged 50 lb/acre for N contributions from soil, legume, irrigation water, and manure sources, with a range from 23 to 331 lb N/acre credit.

Figure 5 (next page) illustrates the range of the actual yields at 22 of the 26 sites with N-rate strips. These were the sites with the recommended, -50 and +50 treatments only. The other four sites had some treatment variations.

The average yields for the twenty-six sites with the comparison strips were:

- recommended rate - 175 bu/A
- -50 lb/acre rate - 168 bu/A
- +50 lb/acre rate - 177 bu/A

Ten sites exceeded their yield goal with the recommended rate, while sixteen sites were under their yield goal.

Figure 4. Yield goals at the sites with N-rate comparison strips.

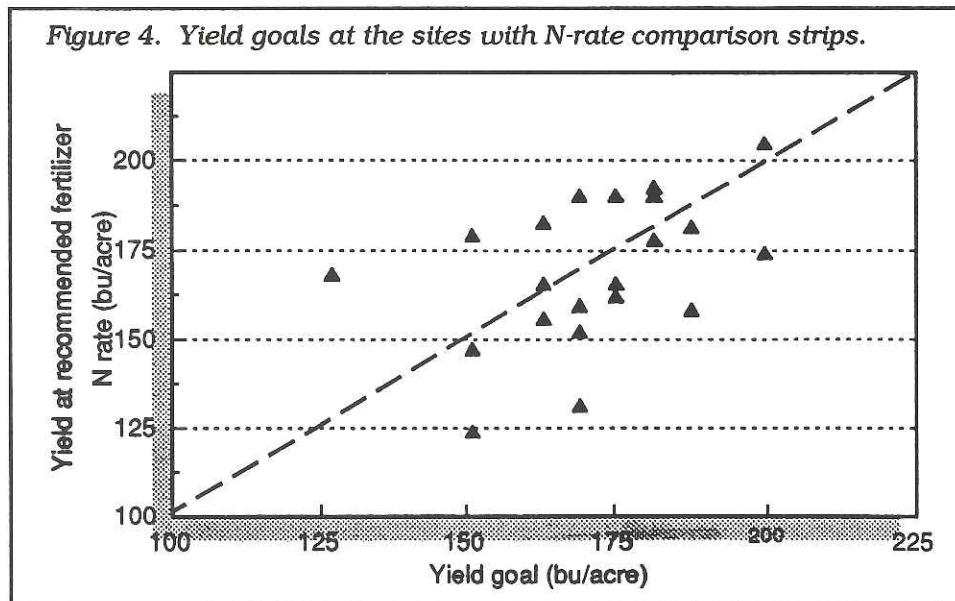
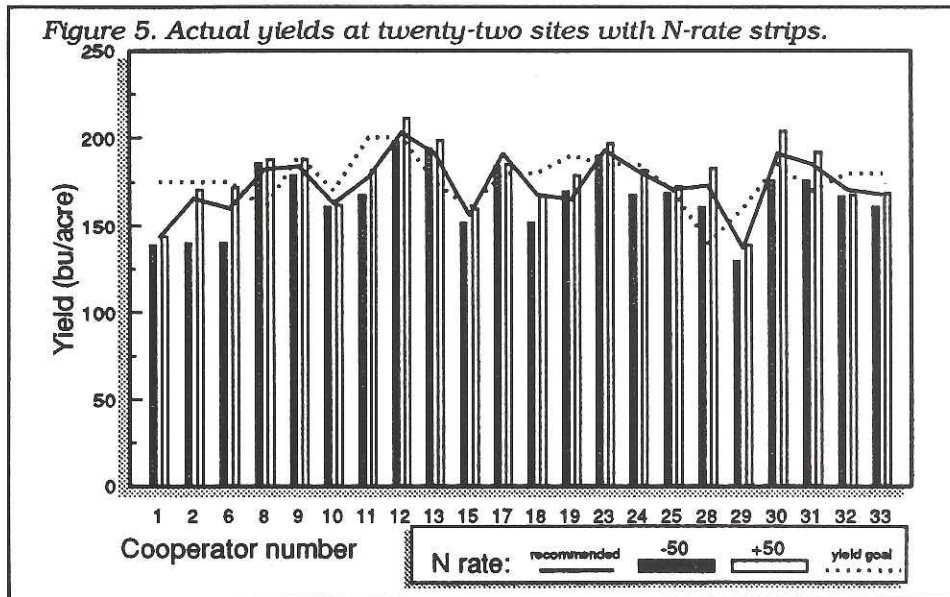


Figure 5. Actual yields at twenty-two sites with N-rate strips.



Irrigation Water Management —

All thirty-three of the sites are irrigated. At thirty of the sites, irrigation water flow was monitored with flow meters. Irrigation scheduling - the checkbook method, moisture blocks, atmometers or soil probes - was implemented on thirty-two sites. The local committees determined which method was to be used at each site.

The scheduling was performed by extension technologists, the local county extension agent, or the consultants hired by the cooperator. In some instances, the cooperator did his own scheduling with assistance from Soil Conservation Service technicians.

Soil moisture blocks were installed at twenty-four of the sites. The blocks were used to determine when irrigation events should occur. The other eight fields used soil probes to determine soil moisture status.

A device that simulates the evapotranspiration of water by the corn plant

was investigated this year. The device, an atmometer, was used at four of the sites. An irrigation flume, a tool used to measure field runoff, was used on four other sites.

Surge valves were installed on nine sites. Several more systems will be installed in 1992. Surge valves are devices that apply irrigation water more uniformly.

Re-use systems were installed at three sites. Plans have been made to install two additional systems in 1992. Two additional sites will have land leveled next year to enhance irrigation effectiveness.

Irrigation water management practices are crucial to decreasing the amount of water that can leach below the root zone. These demonstrated practices provide for the transfer of technology beyond the demonstration sites. Agency personnel and the general public have the opportunity to see how these practices are implemented, and work, in a field situation.

Integrated Pest Management —

Field-scouting reports were the basis for treatment decisions on the project demonstration sites. Then, the computer model was used to provide information for the treatment decision.

For example, the damage from first-generation European corn borer at one site was projected at \$7.40 per acre. The estimate came from field scouting reports used with a UN-L NebGuide worksheet. Using this information, a producer can

decide when, how or even whether or not to treat. Treatment costs could range from \$4-5 per acre at hilling to \$12-13 per acre with aerial spraying.

At harvest, a comparison-strip check at this site showed the loss prevented by the recommended treatment was actually eight bushels per acre, or approximately \$19 per acre.

Treatment at this site went from a three-spray corn rootworm beetle/European corn borer program in 1990 to a spray program based on scouting reports in 1991. This resulted in the elimination of two sprayings and a savings of approximately \$24 per acre in treatment costs.

Another aspect of field scouting and the use of prediction models is the timing of second-generation European corn borer treatment.

Larvae were collected the first week of July from eight sites in the project.

Historic weather data was used to project the optimum date for scouting second-generation egg masses. The model then made predictions of hatching dates on a county-wide basis. An example of the printout is in Table 1.

The flight of

ECB was earlier in 1991 than it was in 1990. The model provided information that accelerated the scouting date and resulted in treatments that were timed for more economical control. Table 2 illustrates the substantial loss that can be avoided by properly timed treatments.

Table 2. Effect of delayed treatment on second generation ECB.

Item	Stage: blister	dough
plants counted	40	—
egg masses found	4	—
eggs/mass	20	—
borer survival	25%	25%
chemical cost	\$12/A	\$12/A
value of corn	\$2.45/bu	\$2.45/bu
expected yield potential	170 bu	170 bu
projected yield loss	5%	3.25%
profit from treating	\$1.95/A	\$2.94/A

Table 1. ECB phenology model oviposition predictions.

Field: Karr & Christiansen
 Location: Webster County
 Date of model run: 06/27/91
 Predicted Oviposition Information:
 (Eggs will give rise to second generation larvae)

<u>% Oviposition</u>	<u>Dates</u>
5%	7/15
25%	7/21
Sample for egg masses between these dates	
50%	7/25
75%	7/28
95%	8/2

Table 3. Summary of practices and results from all of the 1991 demonstration sites.

Plot	--Used in N rate recommendation--			--Measured during season--			Nitrogen Rate	Yield
	Yield Goal	Required Nitrogen	Residual Soil NO ₃ -N	Gross Irrigation	Water NO ₃ -N Content	Gross Water N Applied		
	bu/acre	lbs/acre	lbs/acre	in/acre	ppm	lbs/acre	lbs/acre	bu/acre
1	175	233	50	n/a	8.3	n/a	110 160R 210	139b ¹ 143a 144a
2	175	233	164	15.4	7.8	27	0 50R 100	140b 167a 171a
6	175	233	33	n/a	1.5	n/a	148 198R 248	140c 160b 172a
8	160	215	49	n/a	9.0	n/a	100 150R 200	186a 182a 188a
9	190	251	76	12.2	3.1	9	65 115R 165	179b 184ab 188a
10	170	227	58	19.3	5.2	23	120 170R 220	161a 163a 162a
11	200	264	129	17.5	2.2	9	85 135R 185	168b 178a 182a
12	200	264	49	10.5	7.4	17	165 215R 265	198b 203b 211a
13	175	233	91	n/a	3.6	n/a	92 142R 192	194a 191a 199a
14	180	239	314	n/a	3.6	n/a	0 R 50	163a 154a
15	160	215	63	9.0	0.0	0	100 150R 200	152b 156ab 160a
16	180	239	23	9.0	2.8	6	95 135 175 215R	162b 171ab 170ab 177a
17	180	239	125	12.7	6.4	18	65 115R 165	184b 191a 185b
18	180	239	132	25.9	3.3	19	AA 58* L 58* AA 108R L 108R AA 158	152b 154b 168a 169a 167a

Table 3. Summary of practices and results (continued).

Plot	--Used in N rate recommendation--			--Measured during season--			Nitrogen Rate	Yield
	Yield Goal	Required Nitrogen	Residual Soil NO ₃ -N	Gross Irrigation	Water NO ₃ -N Content	Gross Water N Applied		
	bu/acre	lbs/acre	lbs/acre	in/acre	ppm	lbs/acre	lbs/acre	bu/acre
19	190	251	85	9.5	7.5	16	115 165R 215	170a 175a 179a
20	200	264	28	16.9	6.9	26	121 171 221R	208b 213ab 215a
22	175	233	43	9.9	5.9	13	135 185R 215	157a 160a 159a
23	185	245	88	12.0	n/a	n/a	105 155R 205	190b 193b 197a
24	185	245	102	18.1	4.9	20	101 151R 201	168b 181a 182a
25	170	227	52	20.7	0.9	4	120 170R 220	169b 171ab 173a
28	140	192	59	22.2	6.3	31	67 s 117R* f 117R* 167	161b 173a 190a 183a
29	160	215	167	n/a	5.0	n/a	15 65R 115	130b 137ab 139a
30-1	185	245	197	11.2	1.3	3	0 50R 100	176b 191a 204a
30-2	185	245	53	11.2	1.3	3	90 140R 190	207a 212a 207a
31	170	227	59	9.1	1.9	4	96 146R 196	176b 185ab 192a
32	180	239	92	n/a	7.7	n/a	80 130R 180	167a 171a 168a
33	180	239	71	10.2	17.6	40	120 170R 220	161a 168a 169a

¹ Yields with the same letter are not significantly different at the 5% level of significance, using Duncan's Multiple Range Test.

AA = Anhydrous Ammonia
L = liquid
s = spring
f = fall

Future Plans

Local committees are working through late autumn and winter to plan 1992 demonstrations. Many of the sites will increase the water management efforts in 1992 and begin to focus on the water and nitrate relationship. Each county will be demonstrating that water is lost through the bottom of the root zone and nitrate is carried with it as it leaches to the groundwater.

In subsequent years, the demonstrations will stress management practices that minimize nitrate movement and committees will work to obtain wide-scale adoption of these practices.

Monitoring of the chemical load in the soil will intensify in 1992 with deep soil sampling for nitrate and atrazine. Backed by Natural Resources District funds and University of Nebraska Conservation Survey Division equipment, on-farm tests will investigate the occurrence and distribution of nitrate and atrazine in the vadose zone.

The test will also document the soil structure at depths well below the root zone and determine how that impacts nitrate and atrazine movement.

The goal of the Mid-Nebraska Water Quality Demonstration Project is to accelerate the adoption of management practices that will reduce the chemical load in the soil and reduce the threat to groundwater. Surveys will be done in 1992 to begin to measure the rate of adoption.

Even though there are three years left in the project (planned to end in 1995), the demand for results has already begun. The project is managed, to a large extent, by the target audience. It is imperative that all those with an investment in agriculture work together to voluntarily adopt those practices that can protect our groundwater before we are mandated to do so.



Individual Demonstration Plot Data Summaries

Please note:

Sites 3, 4, 5, 7, 21, 26 and 27 did not compile the yield and nitrogen information and are not included in this summary. Sites 5 and 27 did collect irrigation water information and the water graphs for these sites are located on pages 72 and 73.

How to interpret the irrigation graphs:

The irrigation graphs represent the timing of rainfall and irrigation in relation to the computed soil moisture content. The goal of the recommended irrigation schedule is to allow the root zone to become 50 percent depleted of plant available moisture before recharging with irrigation or rainfall. The final irrigation is planned to leave the root zone 60 percent depleted at plant maturity.

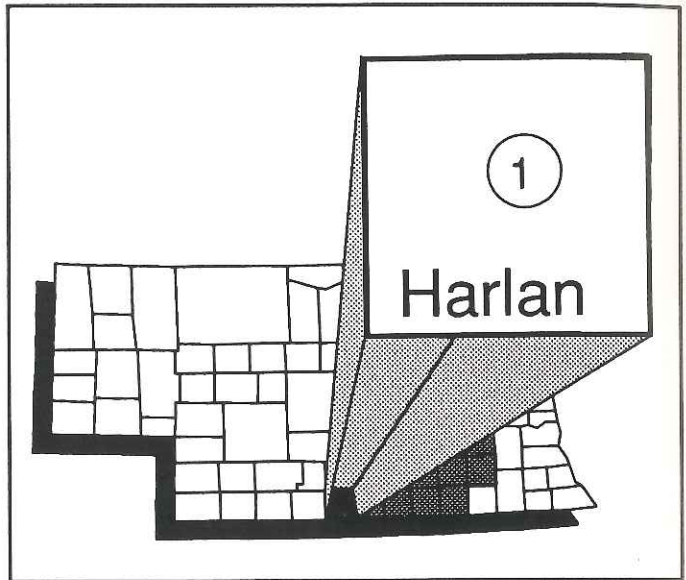
The plant available water (shaded area of the graph) declines at the rate of computed evapotranspiration (ET). Soil moisture is recharged by irrigation and rainfall, but cannot exceed field capacity (a 3-inch irrigation will raise plant available moisture 3 inches if there is at least 3 inches of unfilled capacity). The graphs do not identify runoff or deep percolation. However, when irrigation and rainfall plus plant available water exceed field capacity, the excess is lost to some combination of runoff and deep percolation.

Site 1

Al Hollertz - Harlan County

Site 1 was located on the Al Hollertz farm north of Alma, Neb., in Harlan County. Al has been using a corn/soybean rotation as a standard practice on his farm. The soil type is a Holdrege silt loam with a 0-1 percent slope.

Prior to planting, stalks were shredded and NH_3 was applied down the old row. Al ridge planted an experimental Wilson hybrid at 28,500 seeds/acre on April 25, 1991 in 30-inch rows. Accent and Marksman were broadcast for weed control. Furadan 15G was applied at planting time at a rate of 6.7 pounds/acre. European corn borer was controlled with an aerial application of PennCap-M at a rate of 2 pints/acre.

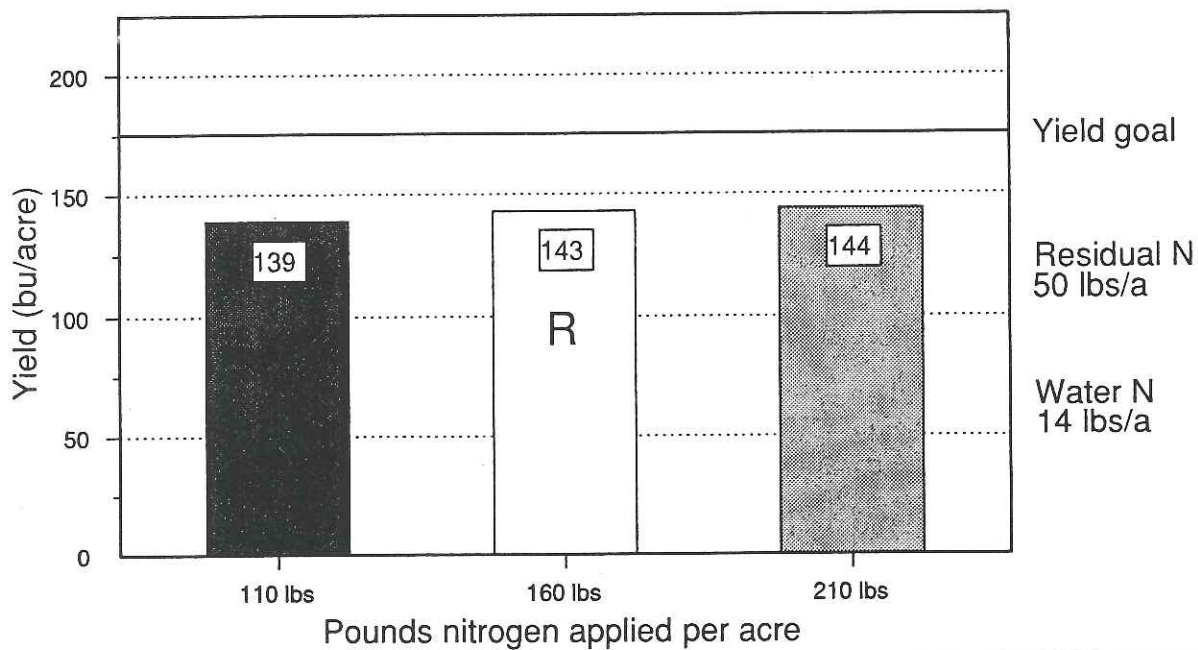


Harvest population was 26,333 plants/acre. Plot strips were six rows wide the length of the field. The three treatments were replicated four times and were applied by the cooperater in a sidedress operation. This site was infected with the Corn Lethal Necrosis (CLN) virus in 1991, which significantly reduced the yields.

Yield results

Yield goal: 175 bu/acre

N required for yield goal: 233 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	7.4
OM	2.6 %
P	21 ppm
K	538 ppm
Zn	1.11 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	110	160	210
Yield avg. (bu/acre)	139	143	144
Yield max. (bu/acre)	142	147	147
Yield min. (bu/acre)	134	140	143
Test wt. (lbs/bu)	57	58	57
Moisture (%)	18.3	17.8	18.2

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
1990	NA	126*	60	165
			110	166
			160	170
1991	14	55**	110	139
			160	143
			210	144

* This number is an average of 15 cores taken over the entire site.

** These numbers are an average of two cores taken top and bottom of each strip.

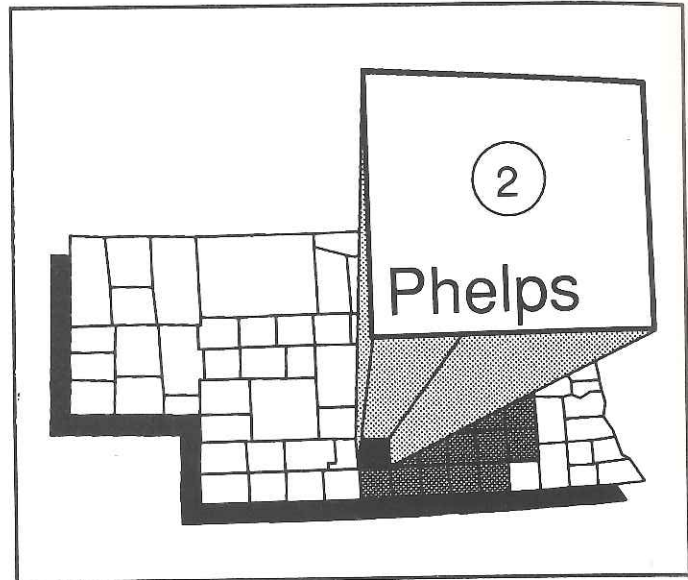
Irrigation information was not available from this site. _____

Site 2

Chris Erickson - Phelps County

Site 2 was located on the Chris Erickson farm north of Holdrege, Neb., in Phelps County. This farm has been in continuous corn production. The soil type is a Holdrege silt loam with a 0-1 percent slope.

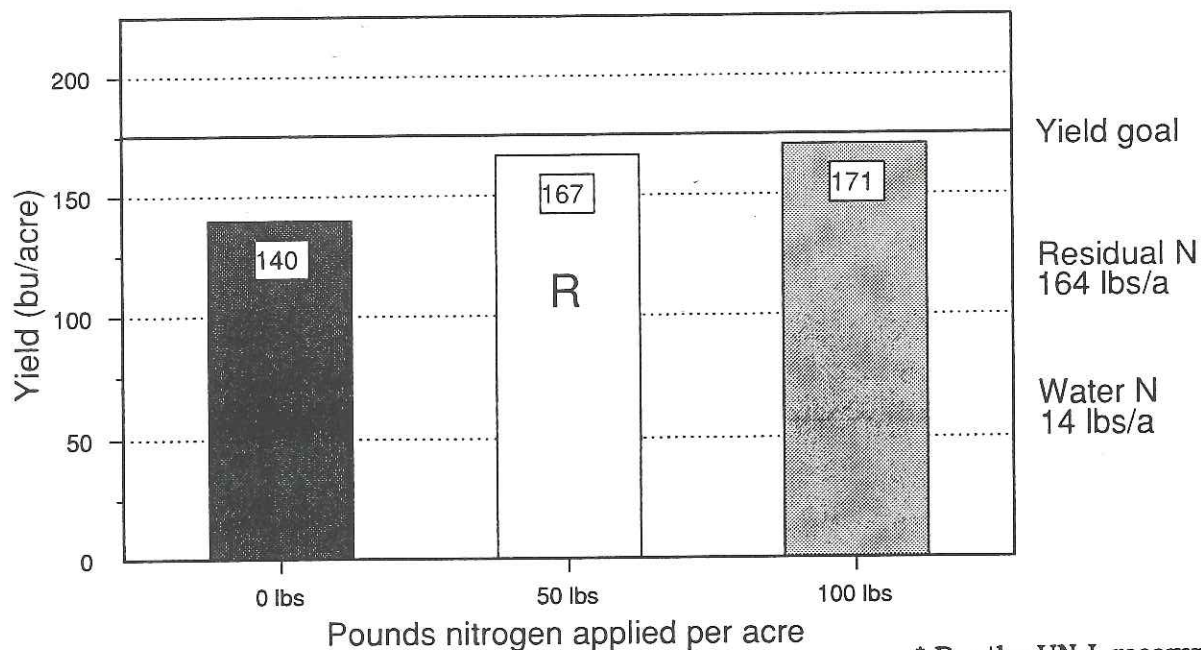
Shredding stalks and fertilizing down the old row were the only field operations done prior to planting. Chris ridge planted Pioneer 3467 at 30,000 seeds/acre in 36-inch rows. A 12-inch band of Bicep, at a rate of one qt/acre, was applied at planting. No soil-applied insecticide was used at planting; however, 1.5 pint/acre of Pennacap-M was applied July 19, 1991 to control second-generation ECB.



Harvest populations were counted at 28,500 plants/acre. Plot strips were twelve rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperator.

Yield results

Yield goal: 175 bu/acre N required for yield goal: 233 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.2
OM	2.9 %
P	26 ppm
K	715 ppm
Zn	3.63 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	0	50	100
Yield avg. (bu/acre)	140	167	171
Yield max. (bu/acre)	162	173	179
Yield min. (bu/acre)	128	163	165
Test wt. (lbs/bu)	59	60	59
Moisture (%)	12.4	12.1	12.4

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
1990	20	111*	82	145
		81	132	148
		127	182	142
1991	14	147	0	140
		164	50	167
		169	100	171

* These numbers are an average of two cores taken top and bottom of each strip.

Irrigation information was not available from this site. _____

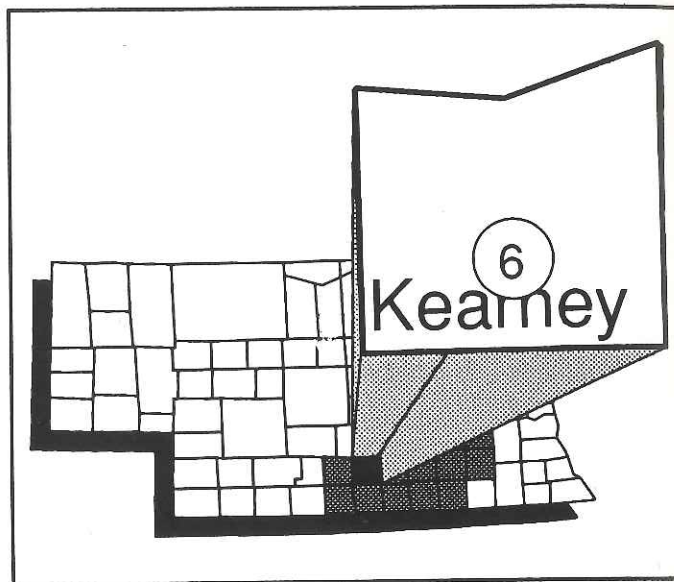
Site 6

Dean Casper - Kearney County

Site 6 was located on the Dean Casper farm south and west of Minden, Neb., in Kearney County. This site has been in continuous corn. The soil type is a Holdrege silt loam with a 0-1 percent slope.

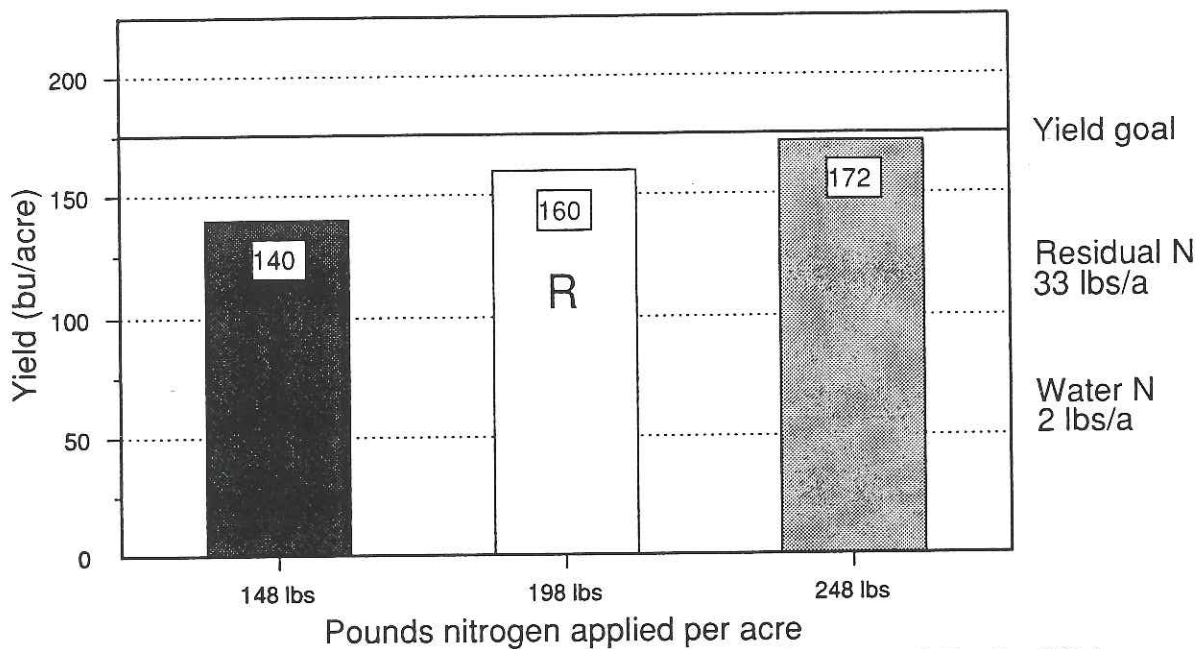
Preplant soil preparation included only the shredding of stalks, since Dean ridge plants his corn. Keltgen 2816 was planted on April 27, 1991 in 36-inch rows. No starter fertilizer was used. Dyfonate was applied at cultivation at the rate of 5.4 lbs/acre. For his herbicide, Dean used 3.5 qt/acre of Lariat in a 15-inch band at planting.

Harvest populations were counted at 23,500 plants/acre. Plot strips were six rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater. It appeared that water may have been a limiting factor on grain yield at this site. Dean's well pumped only 650 gpm to water this 135 acres.



Yield results

Yield goal: 175 bu/acre N required for yield goal: 233 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	7.2
OM	2.4 %
P	44 ppm
K	611 ppm
Zn	1.28 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	148	198	248
Yield avg. (bu/acre)	140	160	172
Yield max. (bu/acre)	148	164	173
Yield min. (bu/acre)	126	155	170
Test wt. (lbs/bu)	58	59	58
Moisture (%)	14.6	14.4	14.6

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
1990	0	110*	75	148
			125	165
			175	173
1991	2	25**	148	140
			198	160
			248	172

* This number is an average of 15 cores taken over the entire site.

** These numbers are an average of two cores taken top and bottom of each strip.

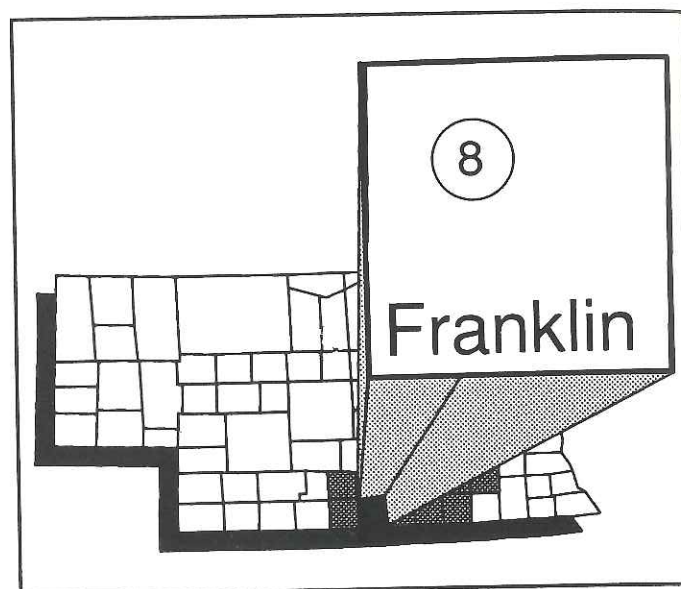
Irrigation information was not available from this site. _____

Site 8

John Jelken - Franklin County

Site 8 was located on the John Jelken farm south and west of Hildreth, Neb., in Franklin County. This farm has been in continuous corn production. The soil type is a Holdrege silt loam with a 0-1 percent slope.

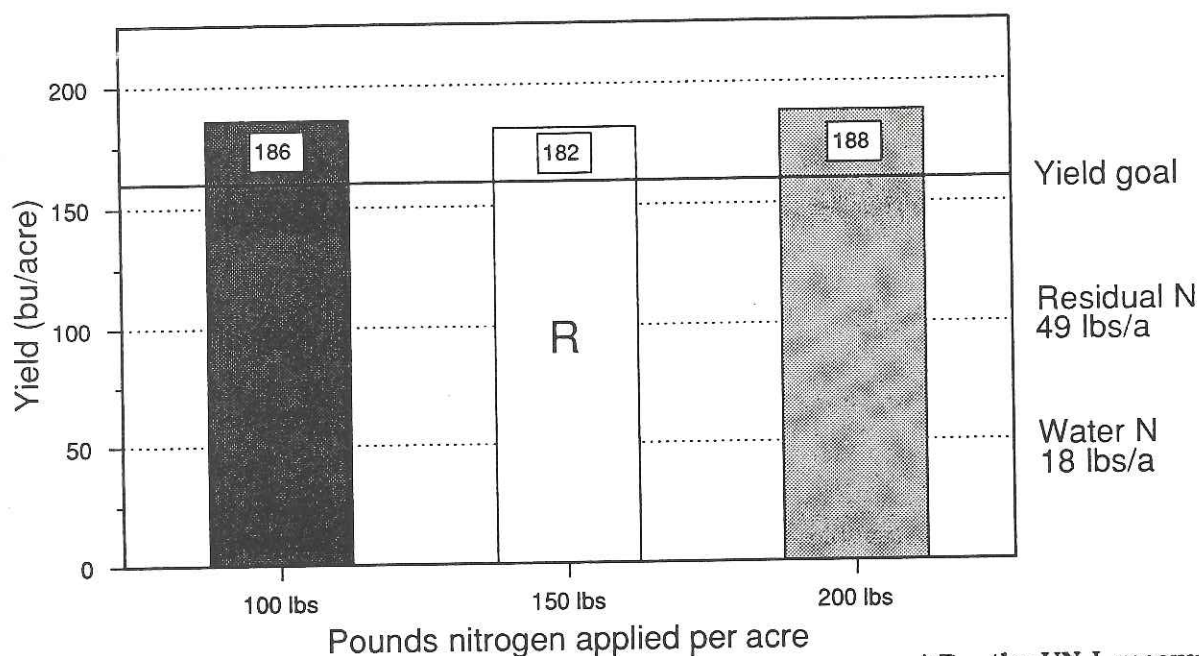
Prior to planting, the only field operation was the shredding of stalks. John ridge planted NC+ 5891 at 29,040 seeds/acre on May 2, 1991 in 36-inch rows. Bicep was applied at the rate of 1.8 quarts/acre, broadcast by a custom applicator. At cultivation, John applied 5 pounds/acre of Furadan for rootworm control. Second-generation ECB was controlled with an aerial application of 3 pints/acre of Penncap-M.



The nitrogen test plot treatments were applied by a custom applicator using a 28-0-0 liquid formulation. Harvest stand counts were 23,000 plants/acre. Plot strips were twenty rows wide, the length of the field. The three treatments were replicated three times.

Yield results

Yield goal: 160 bu/acre N required for yield goal: 215 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	5.7
OM	3.0 %
P	41 ppm
K	587 ppm
Zn	3.65 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	100	150	200
Yield avg. (bu/acre)	186	182	188
Yield max. (bu/acre)	194	201	195
Yield min. (bu/acre)	178	171	184
Test wt. (lbs/bu)	59	59	59
Moisture (%)	15.0	14.1	14.6

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
1990	0	47*	120	184
			170	186
			220	176
1991	18	34**	100	186
			150	182
			200	188

* This number is an average of 15 cores taken over the entire site.

** These numbers are an average of two cores taken top and bottom of each strip.

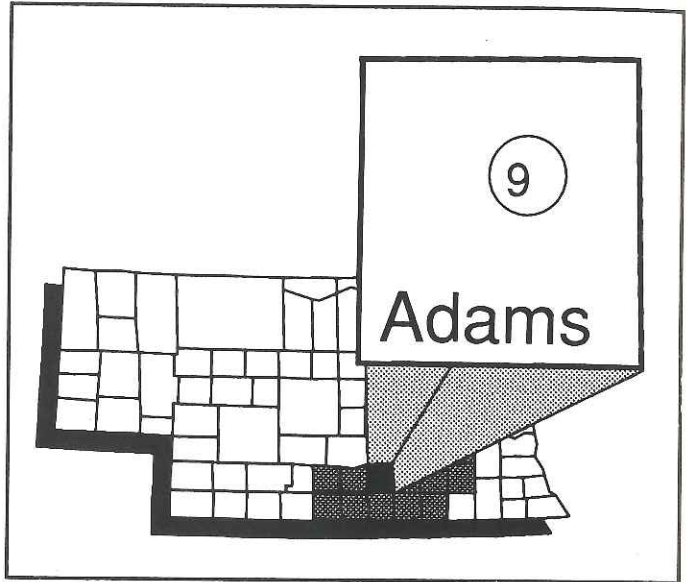
Irrigation information was not available from this site. _____

Site 9

Milton Ruhter - Adams County

Site 9 was located on the Milton Ruhter farm south of Prosser, Neb., in Adams County. A corn/soybean rotation has been the practice on this site. The soil type is a Hord silt loam with a 0-1 percent slope.

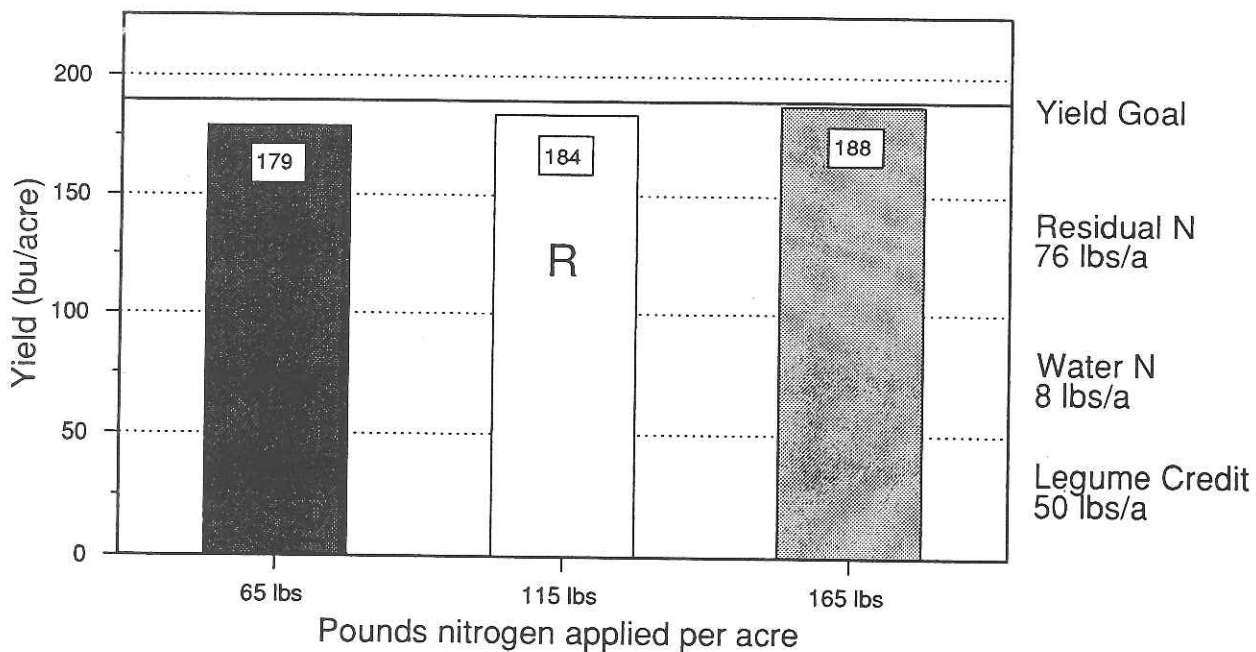
Since Milt ridge plants corn into the soybean stubble, there were no field operations prior to planting. Ohlde 220 was planted on April 24, 1991 at 29,600 seeds/acre in 36-inch rows. He applied five gallons/acre of 10-34-0 in a 2X2 placement at planting. Ten gallons/acre of 28-0-0 was used as a carrier to apply 1.5 pints/acre of Bicep in a 12-inch band. To complete his fertilizer program, Milt put on 90 pounds of N, in a 28-0-0 formulation, during his hilling operation. To control first-generation ECB, five pounds/acre of Dipel was also applied at hilling.



Harvest population was counted at 22,625 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperators.

Yield results

Yield goal: 190 bu/acre N required for yield goal: 252 lbs/acre



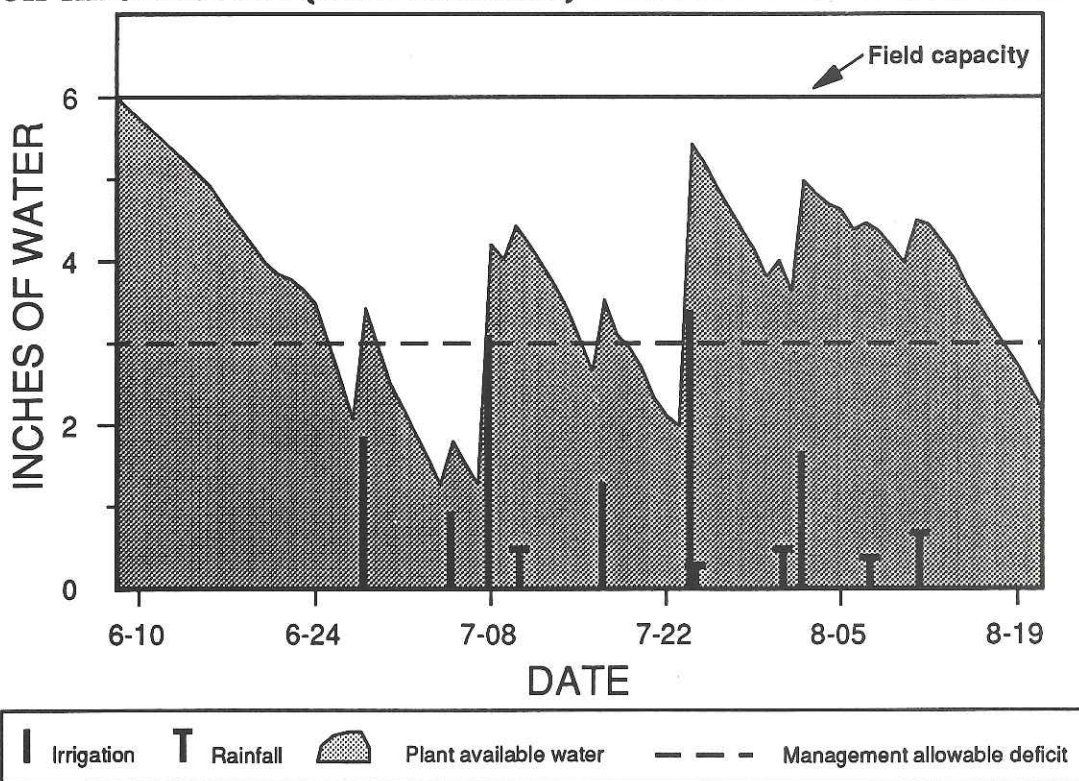
* R = the UN-L recommended rate

General Fertility	
pH	6.1
OM	2.4 %
P	43 ppm
K	438 ppm
Zn	2.24 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	65	115	165
Yield avg. (bu/acre)	179	184	188
Yield max. (bu/acre)	180	190	191
Yield min. (bu/acre)	176	176	186
Test wt. (lbs/bu)	56	56	56
Moisture (%)	19.2	19.3	19.8

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	* Because Milt has a corn/soybean rotation on this plot, this information is not available.			

Irrigation information (conventional)

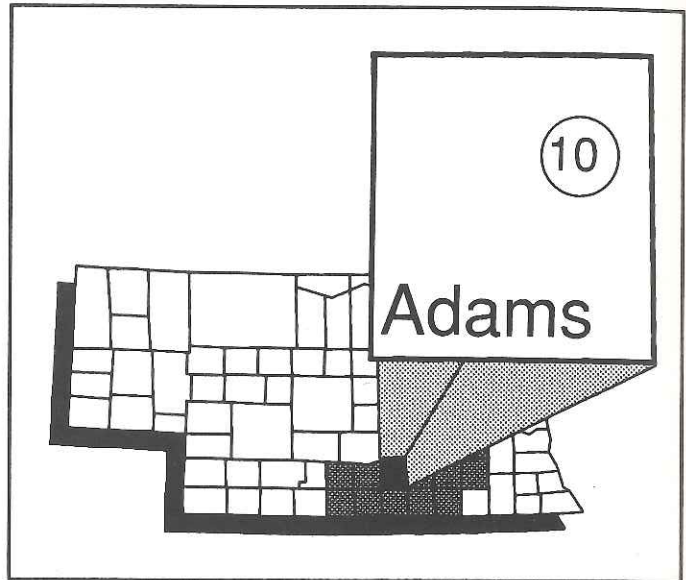


Site 10

Myles Ramsey/William McLeod - Adams County

Site 10 was located on the William McLeod farm south and east of Prosser, Neb., in Adams County. The soil type is a Kenesaw silt loam with a 0-1 percent slope.

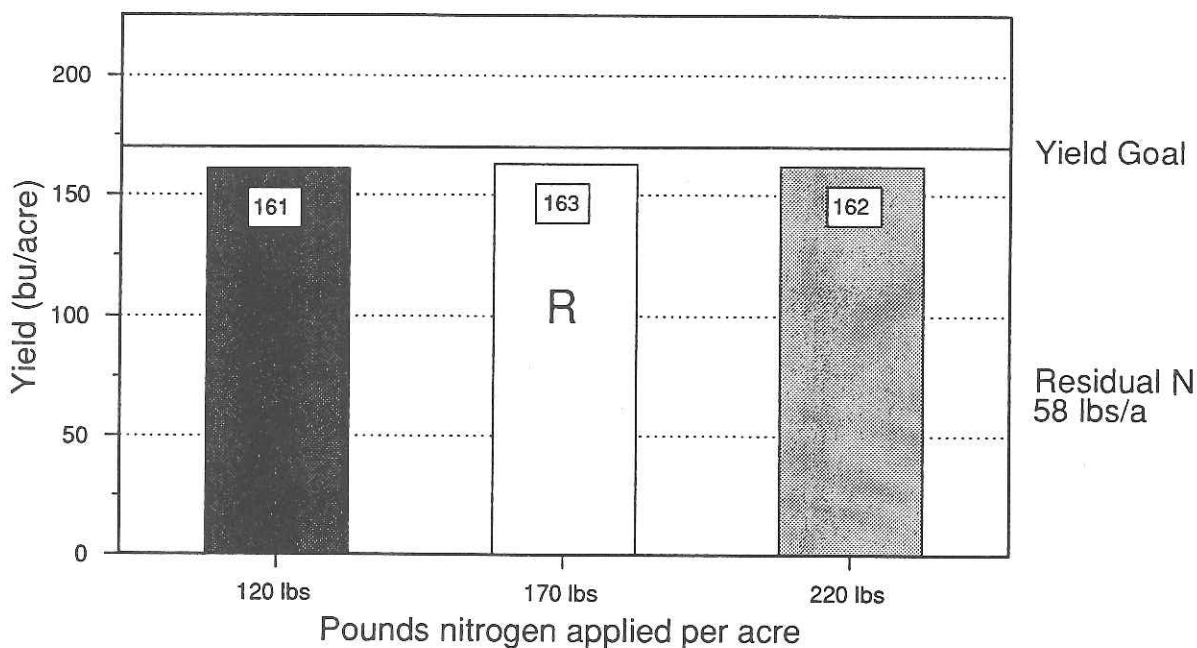
Preplant soil preparation included disking and chiseling. Myles Ramsey planted NC+ 4616 at 28,000 seeds/acre on April 28, 1991 in 36-inch rows. Five gallons/acre of 28-0-0 was applied in a 2x2 placement at planting. A T-band application of 5.5 pounds/acre of Dyfonate II at planting was used for rootworm control. First-generation ECB was also treated with 5.5 pounds/acre of Dyfonate II by an aerial applicator. For weed control, Myles used one quart/acre of Bicep applied in a 14-inch band. The remainder of the nitrogen was applied in a sidedress application at first cultivation.



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

Yield results

Yield goal: 170 bu/acre N required for yield goal: 227 lbs/acre



* R = the UN-L recommended rate

1991 Report

General Fertility	
pH	6.6
OM	1.9 %
P	29 ppm
K	293 ppm
Zn	2.81 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	120	170	220
Yield avg. (bu/acre)	161	163	162
Yield max. (bu/acre)	163	166	167
Yield min. (bu/acre)	155	160	160
Test wt. (lbs/bu)	57	57	57
Moisture (%)	13.8	13.9	13.6

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Myles Ramsey/William McLeod's first year in this project.			

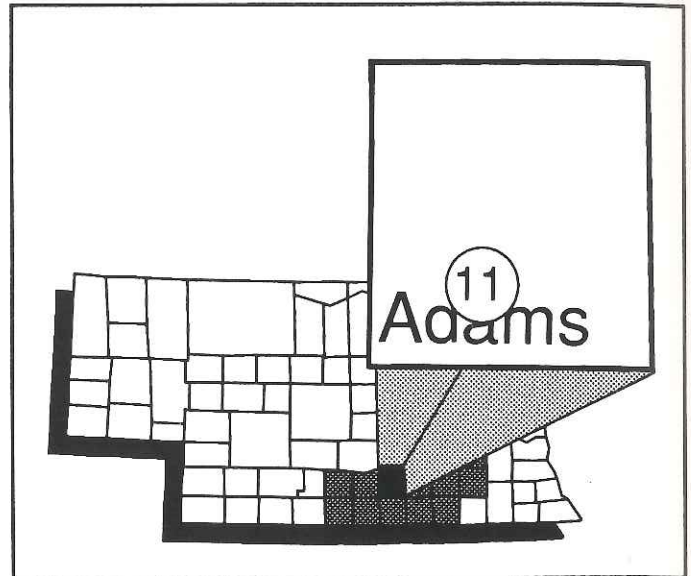
Irrigation information was not available from this site. _____

Site 11

Larry Christenson - Adams County

Site 11 was located on the Larry Christenson farm south of Holstein, Neb., in Adams County. This gravity irrigated farm has used a corn/soybean rotation as part of Larry's normal practices. The soil type is Hord silt loam with a 0-1 percent slope.

Whole farm practices include shredding stalks and placing NH_3 down the old row prior to planting. Larry ridge planted Fontanelle 5230 at 30,100 seeds/acre on April 22, 1991 in 30-inch rows. His herbicide program consisted of a broadcast application of 2.4 qt/acre of Bicep, applied by a custom applicator. Furadan at 4.5 lb/acre was applied the first week in June and 3 pints/acre of PennCap-M was applied on July 27 by an aerial applicator.

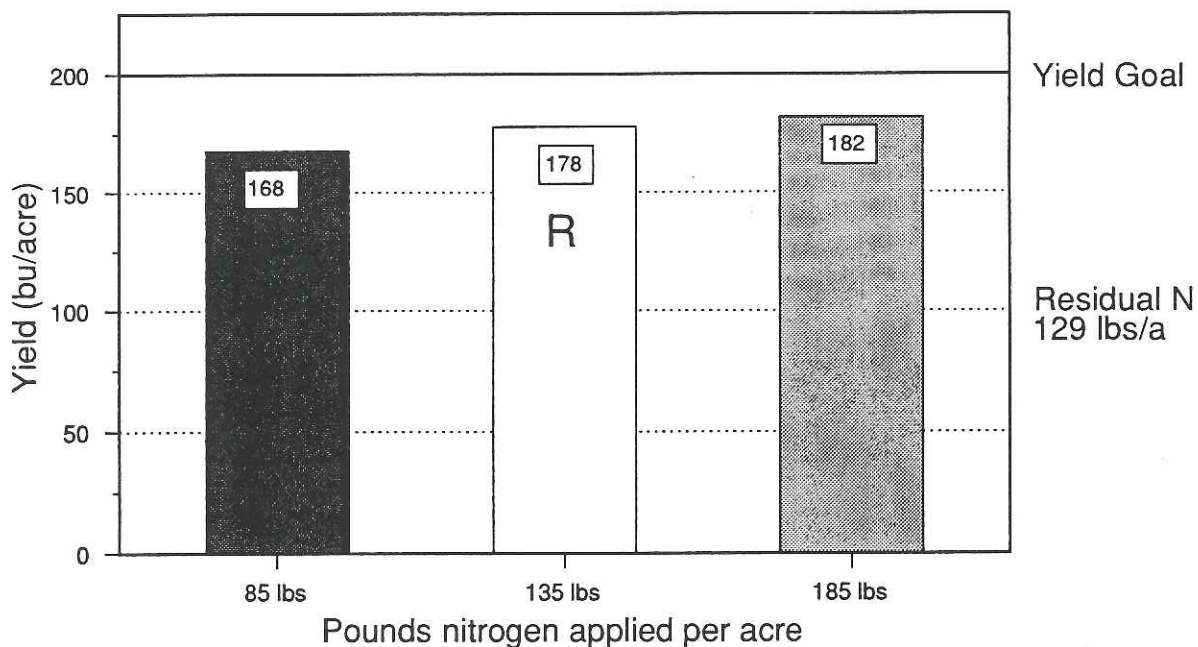


Harvest population counts were 26,250 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperator.

Yield results

Yield goal: 200 bu/acre

N required for yield goal: 264 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.6
OM	2.0 %
P	27 ppm
K	371 ppm
Zn	2.23 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	85	135	185
Yield avg. (bu/acre)	168	178	182
Yield max. (bu/acre)	173	187	191
Yield min. (bu/acre)	159	173	172
Test wt. (lbs/bu)	59	59	59
Moisture (%)	14.9	14.5	14.8

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	Because Larry has a corn\soybean rotation on this site, this information is not available.			

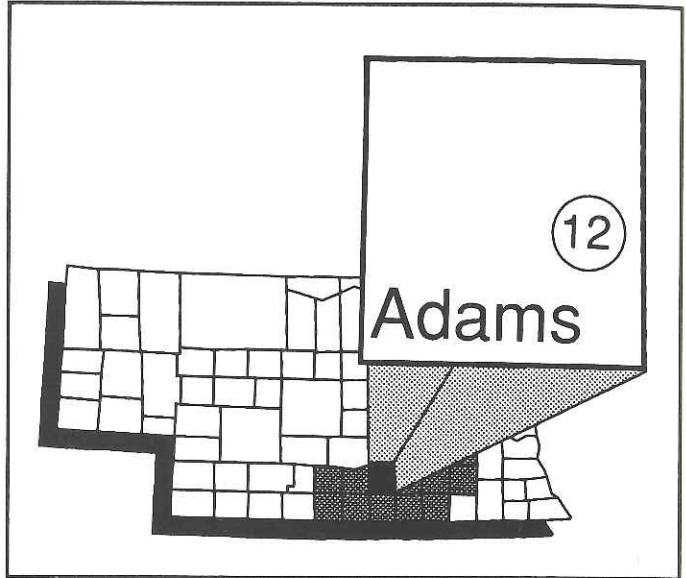
Irrigation information was not available from this site. _____

Site 12

Bruce Bohlen - Adams County

Site 12 was located on the Bruce Bohlen farm southeast of Hastings, Neb., in Adams County. This pivot irrigated farm has been in continuous corn production. The soil type is Hastings silt loam with a 0-1 percent slope.

In the fall of 1990, Bruce shredded the stalks and deep sub-tilled. He planted Pioneer 3162 at 28,300 seeds/acre on May 1, 1991 in 30-inch rows. Six gallons of 10-34-0 and 5 gallons of 28-0-0 was placed below the seed furrow at planting. Bicep was applied at 1 qt/acre in a band with the planter. Bruce used 7.1 lbs/acre of Force insecticide for rootworm control. At the eight-leaf stage, 1 pt/acre of Lorsban 4E with 2 pints of crop oil was applied through the pivot system for ECB control. For second-generation ECB, 1.5 pt/acre of Lorsban 4E with 1.5 pint of crop oil was applied in the same manner, at the dough stage.

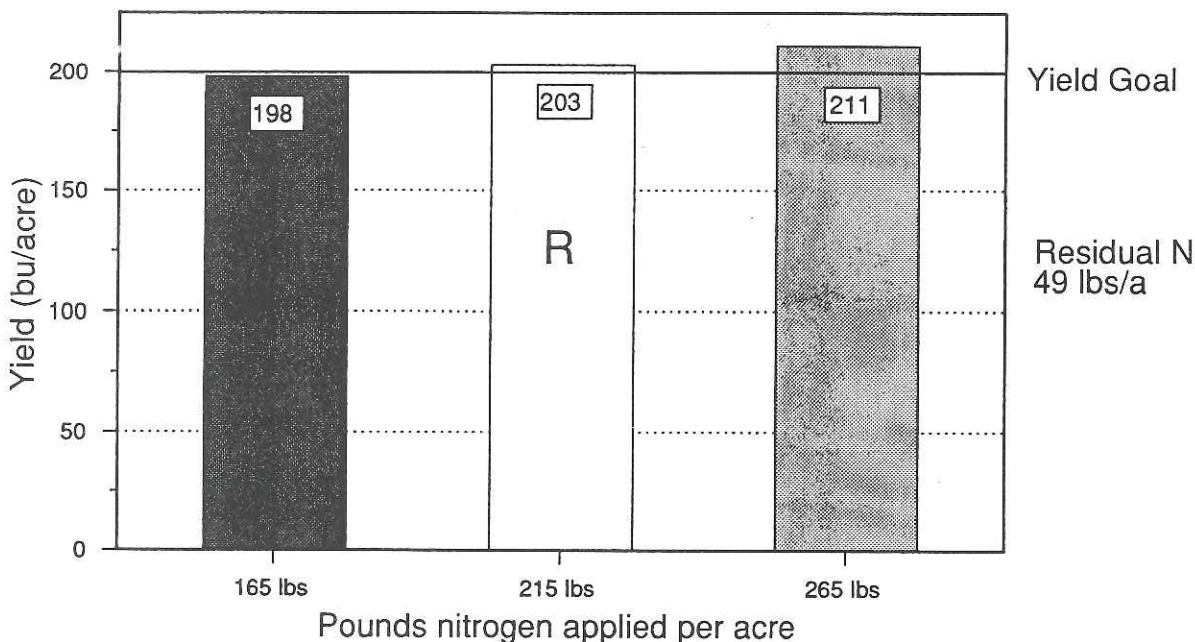


Bruce applied 90 pounds/acre of N through the pivot system. The remainder of N required for the three treatments was applied with a broadcast application of 28-0-0. Harvest count was 28,330 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperators.

Yield results

Yield goal: 200 bu/acre

N required for yield goal: 239 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.5
OM	2.5 %
P	9 ppm
K	286 ppm
Zn	0.95 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	165	215	265
Yield avg. (bu/acre)	198	203	211
Yield max. (bu/acre)	210	212	215
Yield min. (bu/acre)	192	197	207
Test wt. (lbs/bu)	57	57	57
Moisture (%)	17.8	18.3	17.9

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Bruce's first year in this project.			

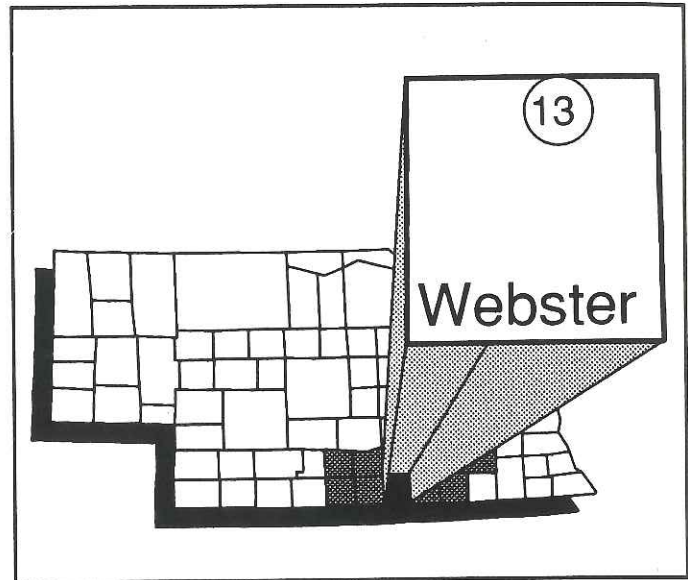
Irrigation information was not available from this site. _____

Site 13

Kevin Karr - Webster County

Site 13 was located on the Kevin Karr farm north of Bladen, Neb., in Webster County. This pivot irrigated farm was corn in 1990. The soil type is a Hastings silt loam with a 0-1 percent slope.

Preplant soil preparation was accomplished with a disk and attached harrow. Kevin planted Garst 8492 at 26,500 seeds/acre on April 27, 1991 in 36-inch rows. Starter fertilizer, at a rate of 4.8 gallons/acre of 10-34-0, was dropped in the seed furrow. His herbicide program included a preplant incorporation of 3.5 lbs/acre of Extrazine. First-generation ECB was treated by air with Pounce granules. Two aerial applications of PennCap-M, later in the season, concluded Kevin's insecticide treatments. One treatment was applied at 1.5 pint/acre, the other at 2 pints/acre.

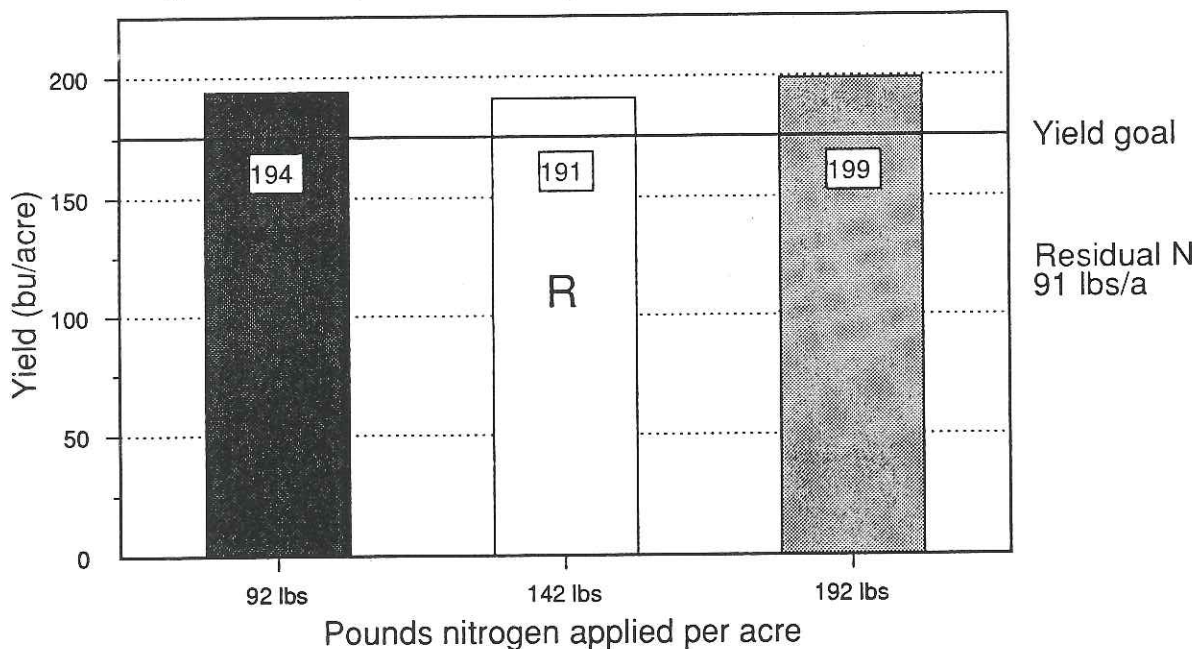


Harvest populations were counted at 27,375 plants/acre. Plot strips were six rows wide, one-half the length of the field. The three treatments were replicated four times and were applied by the cooperator.

Yield results

Yield goal: 175 bu/acre

N required for yield goal: 233 lbs/acre



* R = the UN-L recommended rate

1991 Report

General Fertlilty	
pH	6.4
OM	2.7 %
P	26 ppm
K	1090 ppm
Zn	2.81 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	92	142	192
Yield avg. (bu/acre)	194	191	199
Yield max. (bu/acre)	198	198	203
Yield min. (bu/acre)	189	183	195
Test wt. (lbs/bu)	57	57	58
Moisture (%)	12.8	12.6	12.8

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Kevin's first year in this project.			

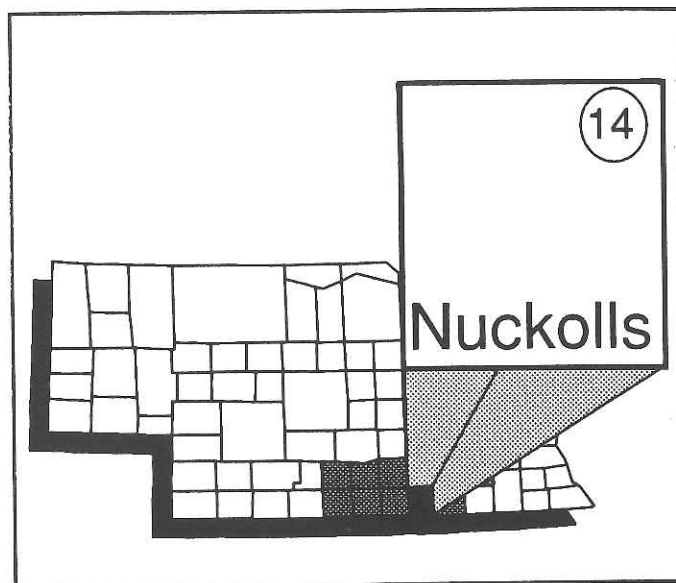
Irrigation information was not available from this site. _____

Site 14

Lale Oellerich - Nuckolls County

Site 14 was located on the Lale Oellerich farm west of Davenport, Neb., in Nuckolls County. This field has been in continuous corn production. The soil type is a Crete silt loam with a 0-1 percent slope.

Shredding stalks and placing NH_3 down the old row were the only operations prior to planting. Lale ridge planted Cargill 7993 at 26,000 seeds/acre on April 25, 1991 in 36-inch rows. He placed 3.8 gallons/acre of 10-34-0 to the side of the seed furrow for a starter, as well as 5.6 lbs/acre of Dyfonate II in a band at planting. Lariat, at the rate of 1.33 qt/acre, was applied in a 15-inch band for weed control.

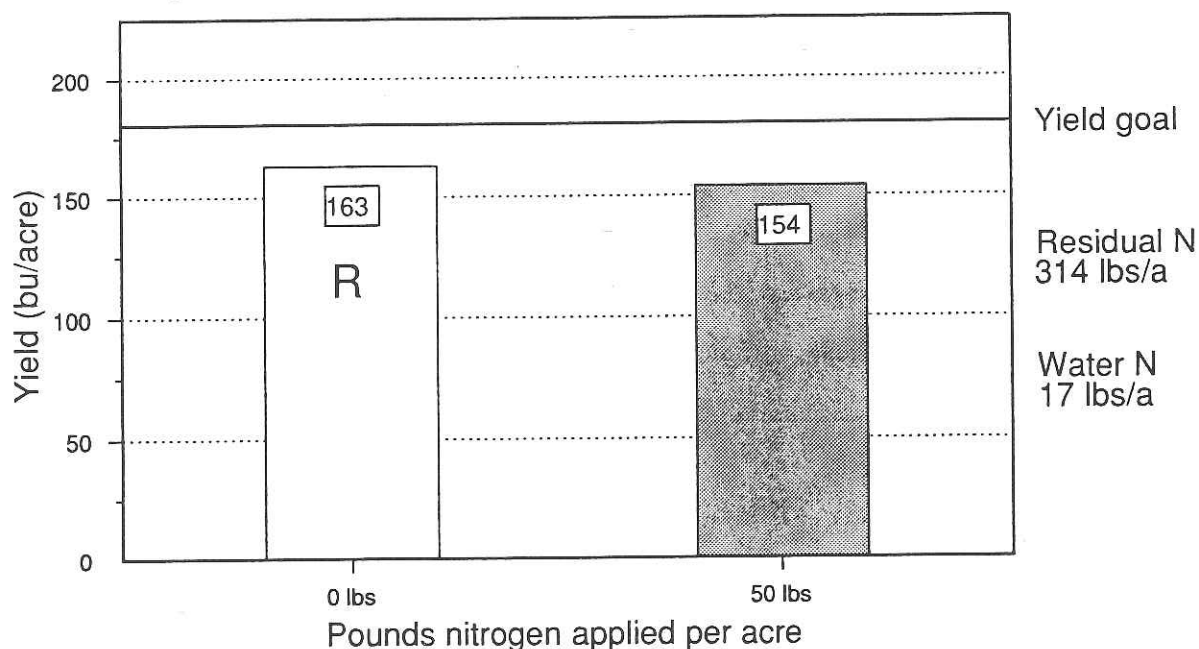


Harvest population was counted at 25,000 plants/acre. Plot strips were eight rows wide, the length of the field. The two treatments were replicated four times and were applied by the cooperator.

Yield results

Yield goal: 180 bu/acre

N required for yield goal: 239 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.0
OM	3.0 %
P	87 ppm
K	559 ppm
Zn	2.29 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)		0	50
Yield avg. (bu/acre)		163	154
Yield max. (bu/acre)		175	171
Yield min. (bu/acre)		156	147
Test wt. (lbs/bu)		59	60
Moisture (%)		14.3	14.3

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Lale's first year in this project.			

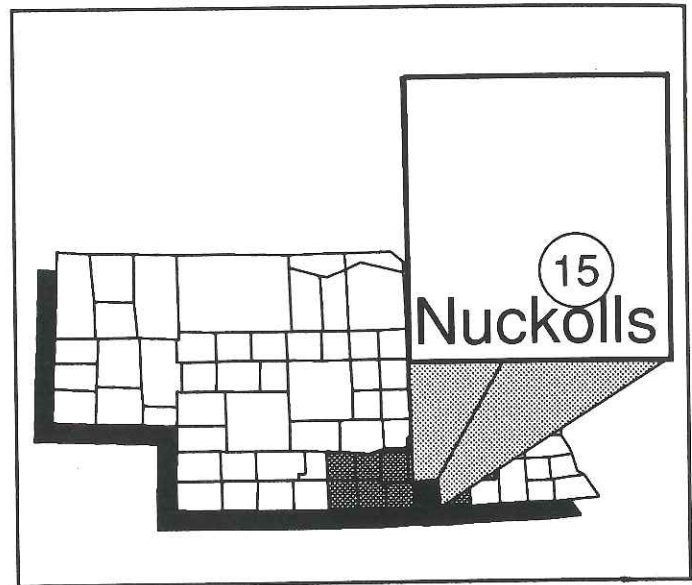
Irrigation information was not available from this site. _____

Site 15

Don Kottmeyer - Nuckolls County

Site 15 was located on the Don Kottmeyer farm located east of Superior, Neb., in Nuckolls County. This site has been in continuous corn production. The soil type is a Hord silt loam with a 0-1 percent slope.

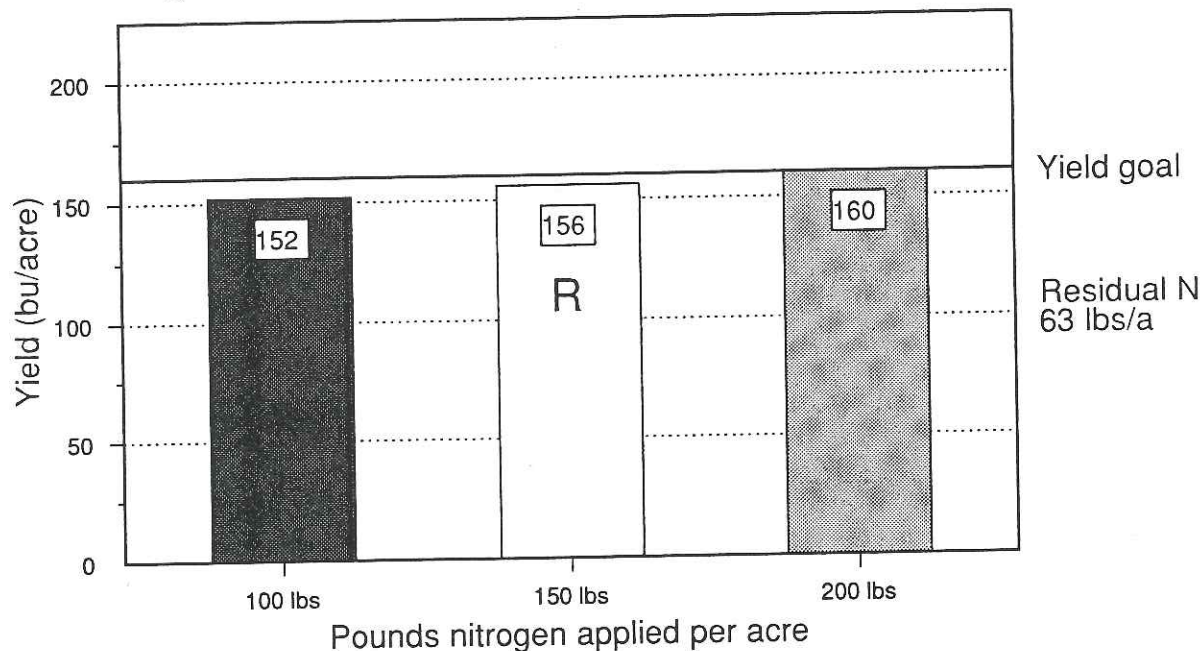
Stalks were shredded prior to planting. Don ridge planted Golden Harvest 2525 at 26,000 seeds/acre on May 1, 1991 in 36-inch rows. For rootworm control, 4.5 pounds/acre of Dyfonate II was applied in a band at planting. His herbicide program consisted of a Bicep plus Dual tank mix applied in a 12-inch band. Half of the field was treated with Furadan, at hilling, for first-generation ECB. Penncap-M was applied by air for second-generation ECB.



Plot strips were ten rows wide, the length of the field. The three treatments were replicated three times and were applied by a commercial applicator using a 28-0-0 liquid formulation.

Yield results

Yield goal: 160 bu/acre N required for yield goal: 215 lbs/acre



* R = the UN-L recommended rate

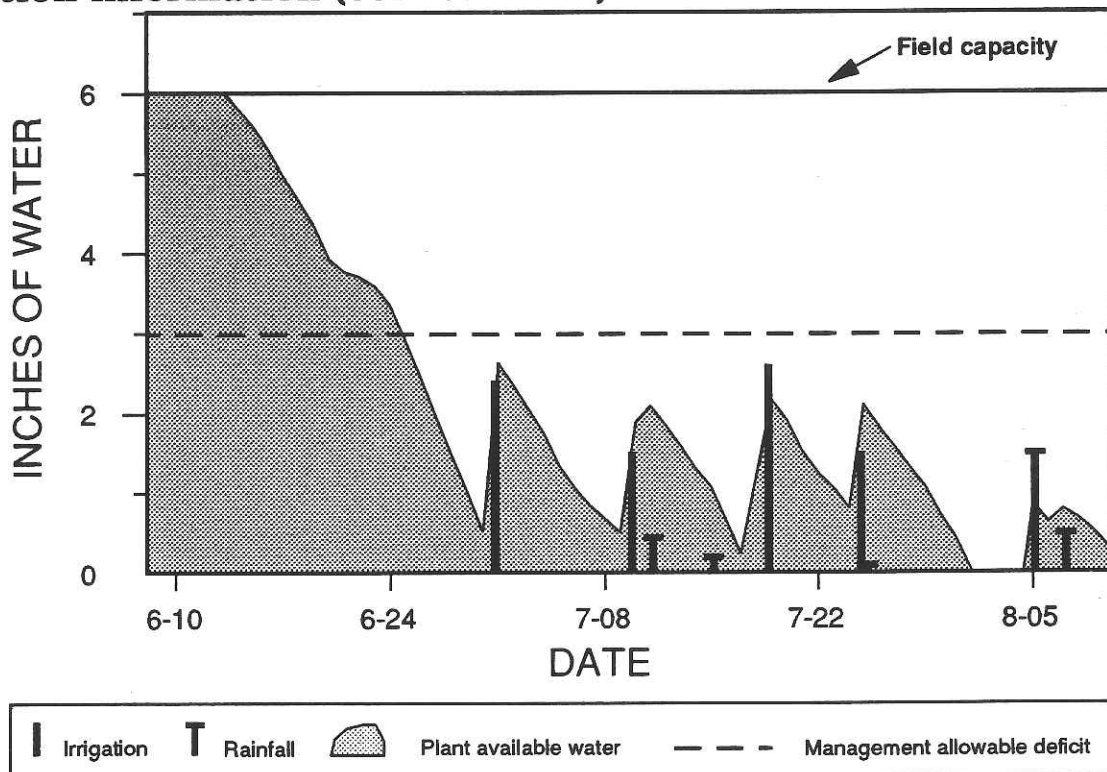
General Fertility	
pH	5.7
OM	3.5 %
P	41 ppm
K	631 ppm
Zn	2.63 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	100	150	200
Yield avg. (bu/acre)	152	156	160
Yield max. (bu/acre)	159	159	162
Yield min. (bu/acre)	148	153	157
Test wt. (lbs/bu)	N/A	N/A	N/A
Moisture (%)	14.3	14.2	14.8

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
1990	0	74*	80	151
		88	130	152
		41	180	155
1991	0	72	100	152
		63	150	156
		86	200	160

* These numbers are an average of two cores taken top and bottom of each strip.

Irrigation information (conventional)

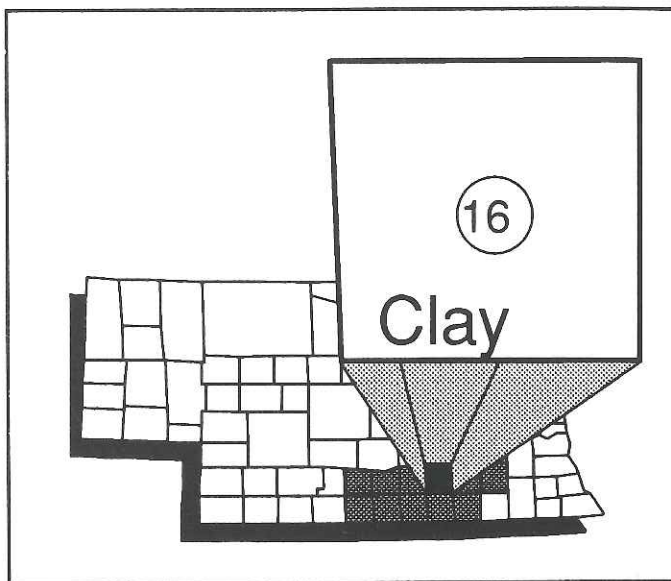


Site 16

Steve Yost - Clay County

Site 16 was located on the Steve Yost farm south of Harvard, Neb., in Clay County. A corn/soybean rotation has been a standard management practice on this pivot irrigated farm. The soil type is a Crete silt loam with a 0-1 percent slope.

The only field operation prior to planting is shredding the stalks. Steve ridge planted Golden Harvest 2525 at 27,500 seeds/acre on April 27, 1991 in 30-inch rows. Nitrogen applications were made using 28-0-0 liquid formulation in a split application, 40 percent at planting and 60 percent at cultivation. The herbicide program consisted of 2.5 pt/acre of Marksman, broadcast at the five-leaf stage.

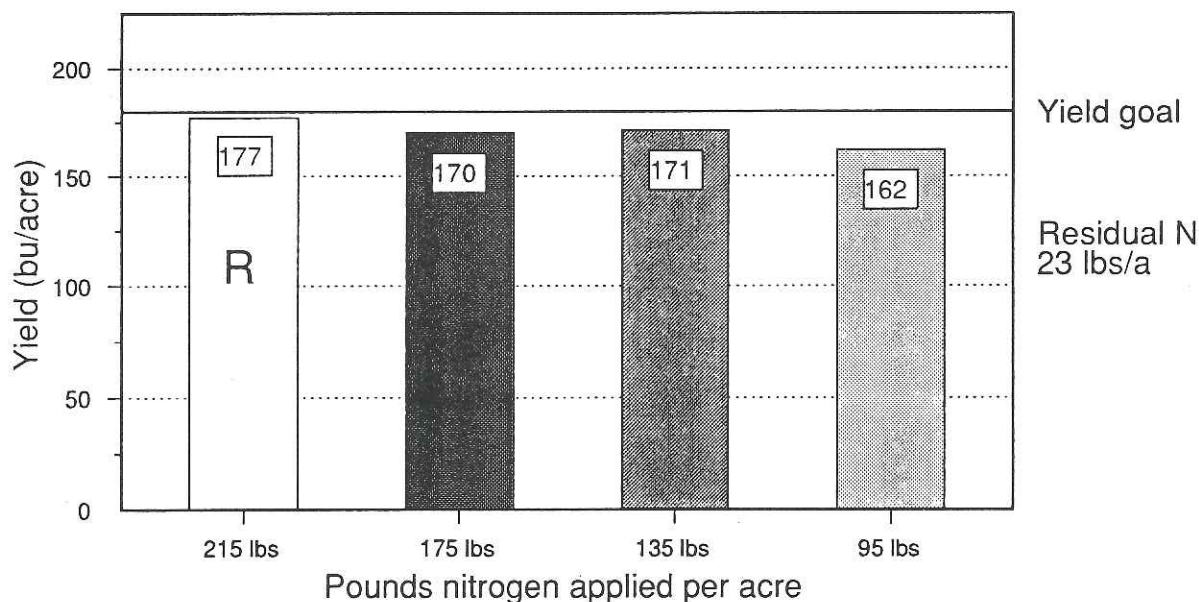


Plot strips were eight rows wide, the length of the field. The four treatments were replicated four times and were applied by the cooperators. Harvest population was counted at 23,375 plants/acre. Stand counts were reduced even further in some parts of the nitrogen plots due to herbicide damage.

Yield results

Yield goal: 180 bu/acre

N required for yield goal: 239 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.6
OM	2.8 %
P	7 ppm
K	338 ppm
Zn	1.44 ppm

Treatment	Rec	- 40	- 80	-120
N rate (lbs/acre)	215	175	135	95
Yield avg. (bu/acre)	177	170	171	162
Yield max. (bu/acre)	183	174	178	170
Yield min. (bu/acre)	169	166	167	156
Test wt. (lbs/bu)	57	57	57	57
Moisture (%)	14.8	14.5	14.2	14.2

**Steve elected to apply three minus rates and not the +50 rate.*

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Steve's first year in this project.			

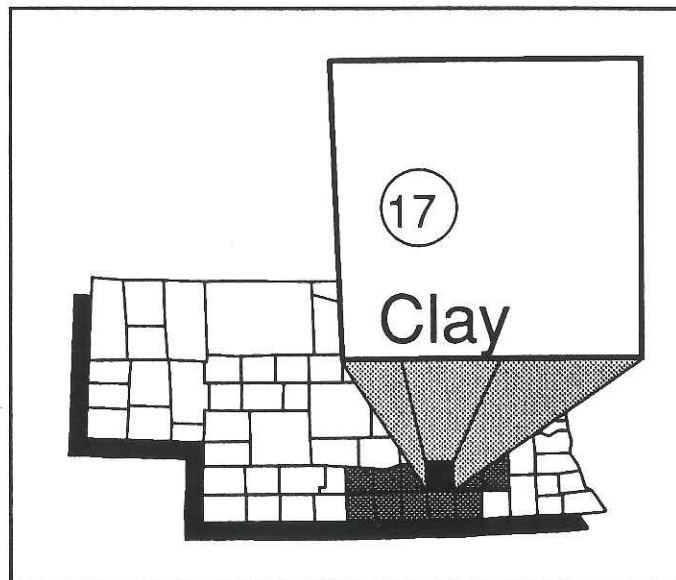
Irrigation information was not available from this site. _____

Site 17

Dave Hamburger - Clay County

Site 17 was located on the Dave Hamburger farm east of Inland, Neb., in Clay County. A corn/soybean rotation has been a standard management practice on this farm. The soil type is a Crete silt loam with a 0-1 percent slope.

Whole farm practices include two diskings and a preplant application of NH_3 prior to planting. Dave planted NC+ 5891 at 28,000 seeds/acre on May 12, 1991 in 30-inch rows. He also applied nine gallons/acre of 10-34-0 + Zn, two inches to the side of the corn at planting, as well as 6.67 lbs/acre of Counter insecticide in a T-band. The herbicide program consisted of three quarts/acre of Lasso/Atrazine, broadcast in a pre-emergence application.

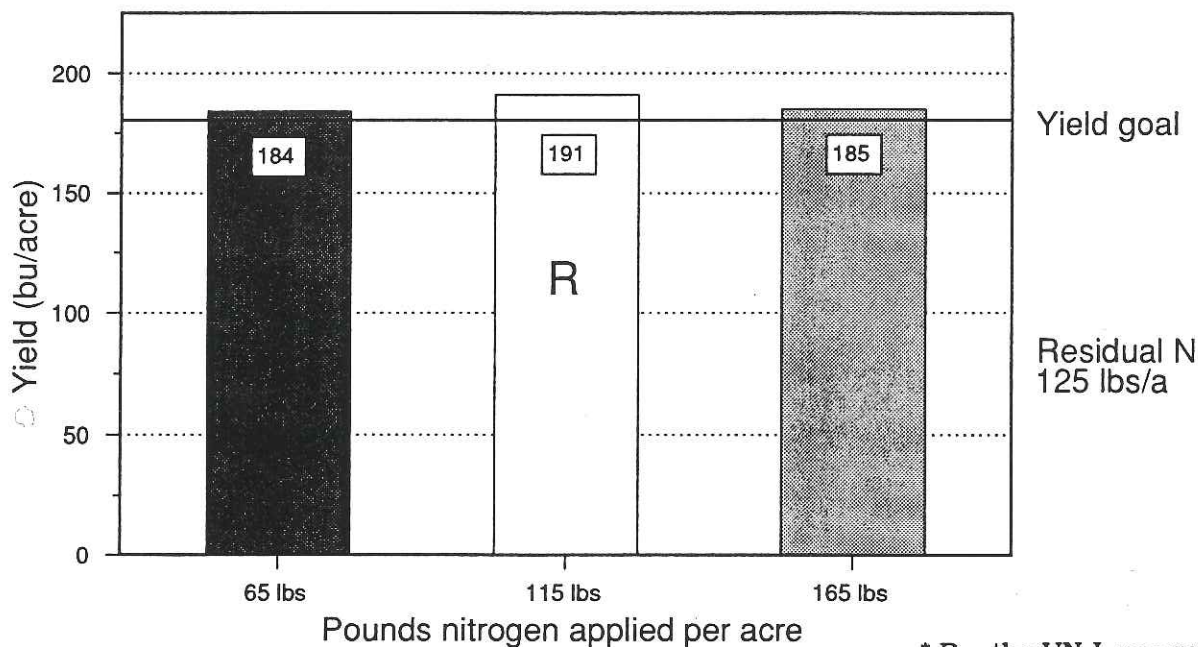


The plot area had the low rate of 65 pounds of NH_3 applied in a preplant application across the entire plot, with the balance of the recommended and high rate treatments applied in a sidedress application. Harvest population was counted at 25,660 plants/acre. Plot strips were six rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Yield results

Yield goal: 180 bu/acre

N required for yield goal: 239 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.2
OM	2.7 %
P	22 ppm
K	340 ppm
Zn	2.16 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	65	115	165
Yield avg. (bu/acre)	184	191	185
Yield max. (bu/acre)	193	198	195
Yield min. (bu/acre)	170	184	174
Test wt. (lbs/bu)	60	59	59
Moisture (%)	16.0	15.8	15.2

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Dave's first year in this project.			

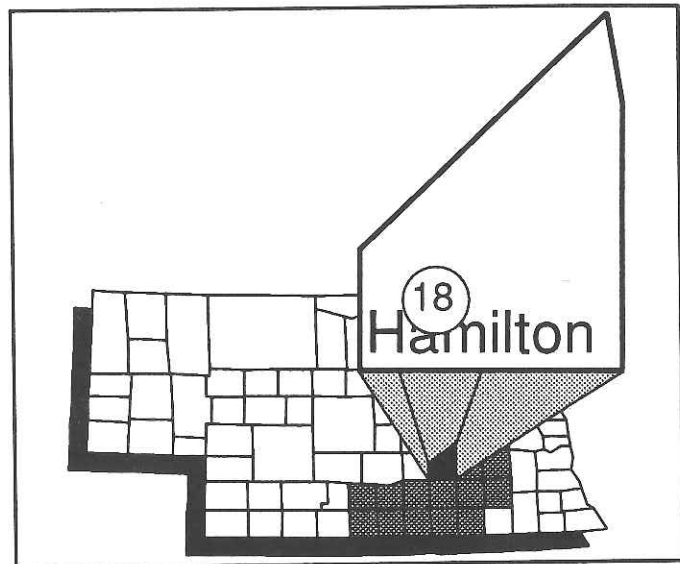
Irrigation information was not available from this site. _____

Site 18

Clayton Higgins - Hamilton County

Site 18 was located on the Clayton Higgins farm west of Giltner, Neb., in Hamilton County. This farm has been in continuous corn production. The soil type is a Hastings silt loam with a 0-1 percent slope.

Clayton's planting method is ridge till. His only field operation prior to planting was to shred stalks and apply NH_3 down the old row. He planted Fontanelle 6240 on April 26, 1991 at 26,000 seeds/acre in 36-inch rows. At planting, 1.2 lbs/acre of Atrazine was applied in a band. No soil-applied insecticides were used. First-generation ECB control was achieved using 3.8 lbs/acre of Furadan at hilling. One pint/acre of PennCap-M was flown on for second-generation ECB control.

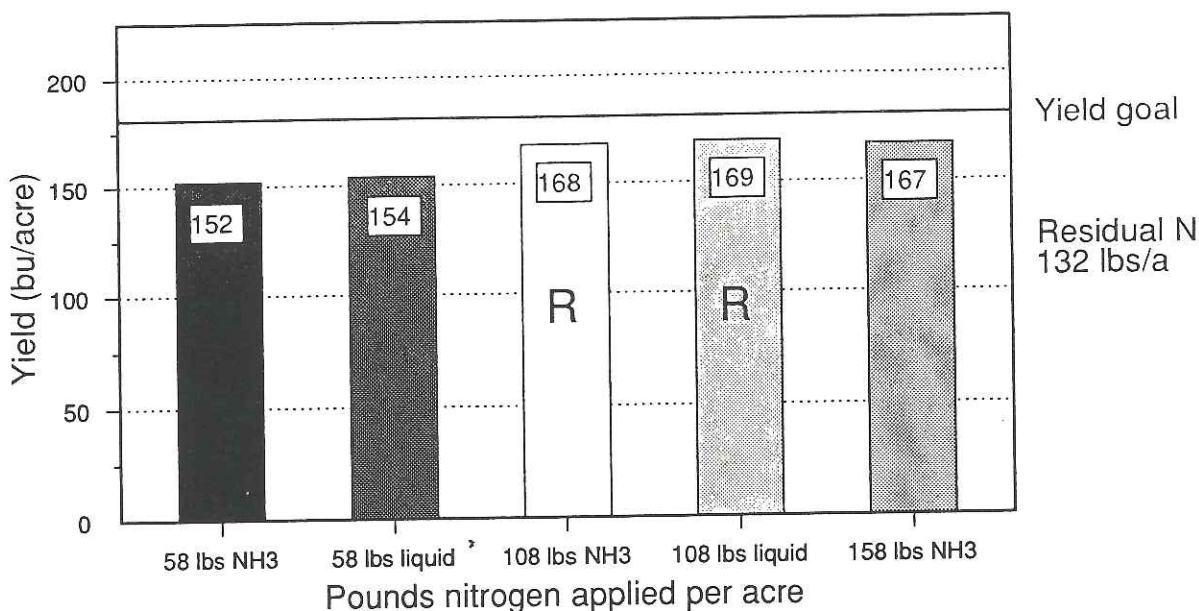


Harvest population was 25,125 plants/acre. Plot strips were twelve rows wide, the length of the field. The five treatments were replicated four times. The NH_3 treatments were applied by the cooperator and the liquid treatments were applied by Heartland Co-op of Giltner.

Yield results

Yield goal: 180 bu/acre

N required for yield goal: 239 lbs/acre



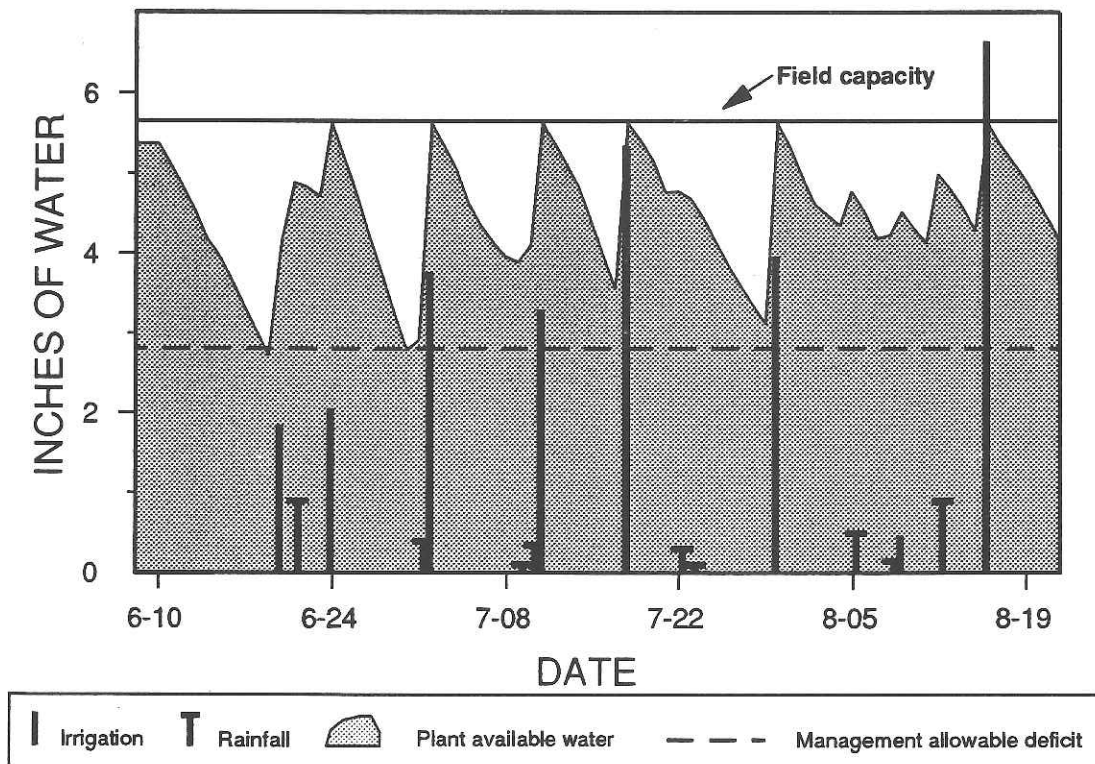
* R = the UN-L recommended rate

General Fertility	
pH	6.4
OM	3.2 %
P	21 ppm
K	441 ppm
Zn	1.74 ppm

Treatment	- Rec (NH3)	-Rec (liq.)	Rec (NH3)	Rec (liq.)	+ Rec (NH3)
N rate (lbs/acre)	58	58	108	108	158
Yield avg. (bu/acre)	152	154	168	169	167
Yield max. (bu/acre)	163	172	178	179	177
Yield min. (bu/acre)	138	128	155	146	156
Test wt. (lbs/bu)	58	59	58	57	59
Moisture (%)	16.4	17.1	17.3	16.9	16.7

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Clayton's first year in this project.			

Irrigation information (conventional)

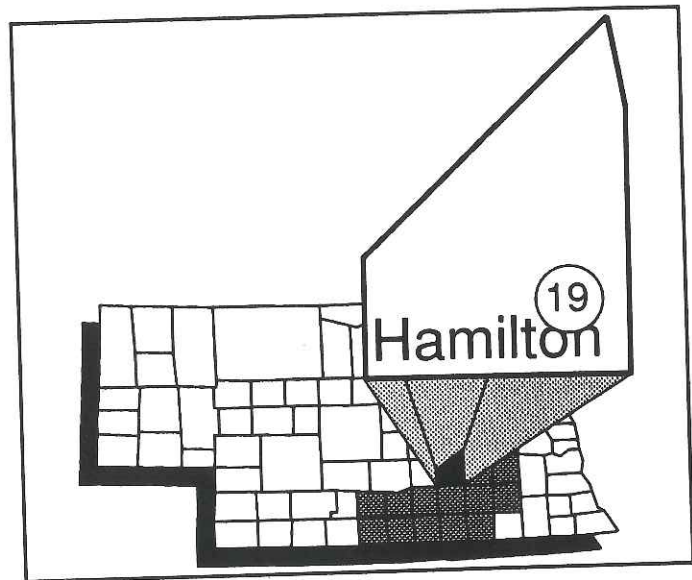


Site 19

Carey Friesen- Hamilton County

Site 19 was located on the Carey Friesen farm north and west of Henderson, Neb., in Hamilton County. This farm has been in continuous corn production. The soil type is a Crete silt loam with a 0-1 percent slope.

Seedbed preparation began with a fall disking. NH_3 was applied in the spring. Field cultivation just prior to planting finished the soil preparation. Carey planted Garst 8492 at 29,000 seeds/acre on April 24, 1991 in 30-inch rows. He also placed 4 gal/acre of 10-34-0 with the seed at planting, as well as 6.5 lbs/acre of Lorsban in a T-band. His herbicide program included 1.25 qt/acre of Atrazine plus 1 qt/acre of Prowl in a 15-inch band at planting.

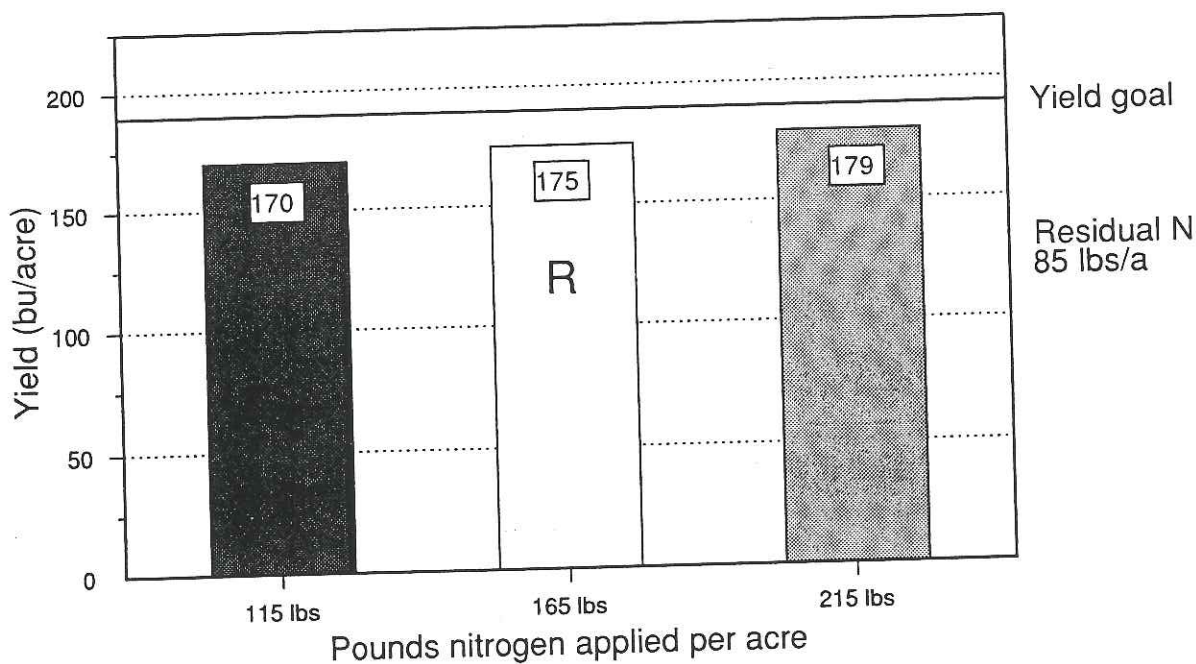


Harvest population was counted at 27,500 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater. Carey's farm suffered 20-30 percent hail damage to the whole field, as well as some herbicide damage, which reduced the plant stand in some parts of the plot.

Yield results

Yield goal: 190 bu/acre

N required for yield goal: 252 lbs/acre



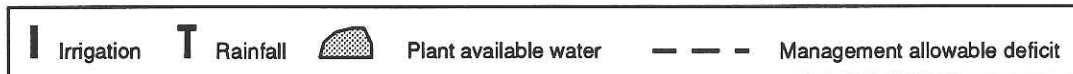
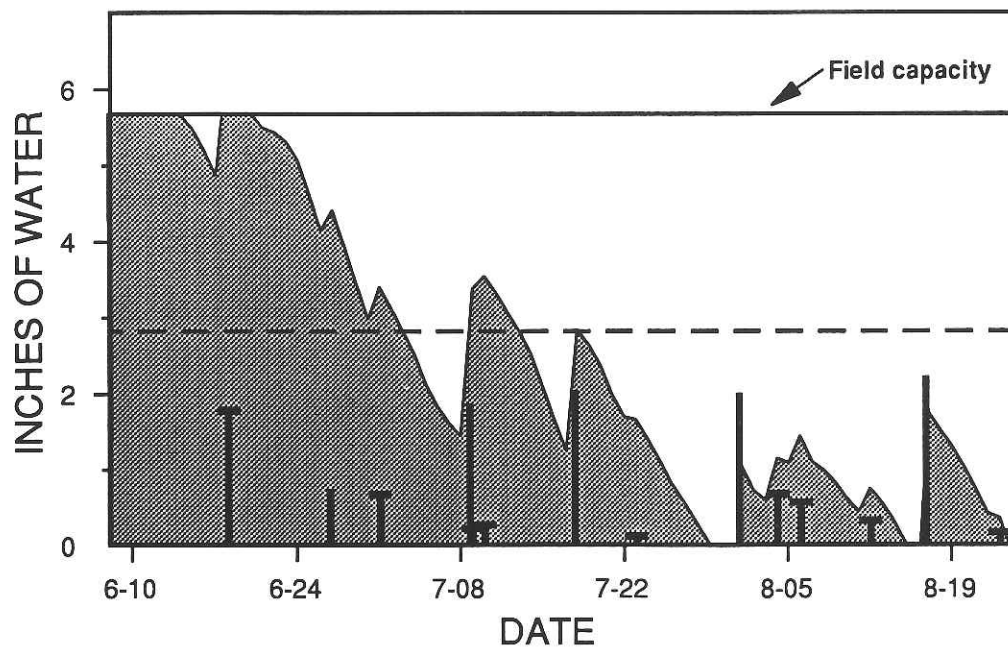
* R = the UN-L recommended rate

General Fertility	
pH	6.5
OM	3.4 %
P	20 ppm
K	422 ppm
Zn	0.65 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	115	165	215
Yield avg. (bu/acre)	170	175	179
Yield max. (bu/acre)	172	179	184
Yield min. (bu/acre)	164	170	173
Test wt. (lbs/bu)	56	56	56
Moisture (%)	20.8	21.1	20.8

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Carey's first year in this project.			

Irrigation information (conventional)

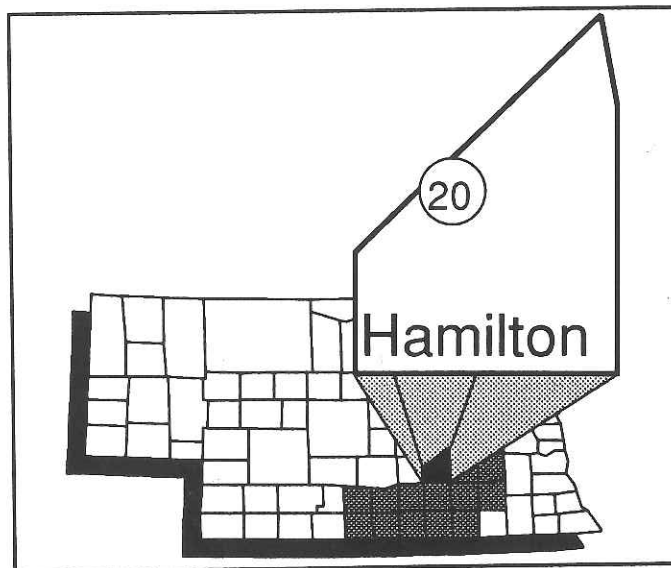


Site 20

Curt Carlson- Hamilton County

Site 20 was located on the Curt Carlson farm north and east of Aurora, Neb., in Hamilton County. This field has been in continuous corn production. The soil type is a Holder silt loam with a 0-1 percent slope.

Whole farm practices included shredding stalks and a preplant application of NH_3 down the old row. Curt ridge planted Pioneer 3379 at 30,000 seeds/acre on April 25, 1991 in 30-inch rows. He also applied 5 gals/acre of 10-34-0 with the seed, as well as 9 lbs/acre of Counter 15G insecticide in the furrow. The herbicide program consisted of 1 qt/acre of Lariat plus 1 pt/acre of Atrazine applied in a 10-inch band at planting.

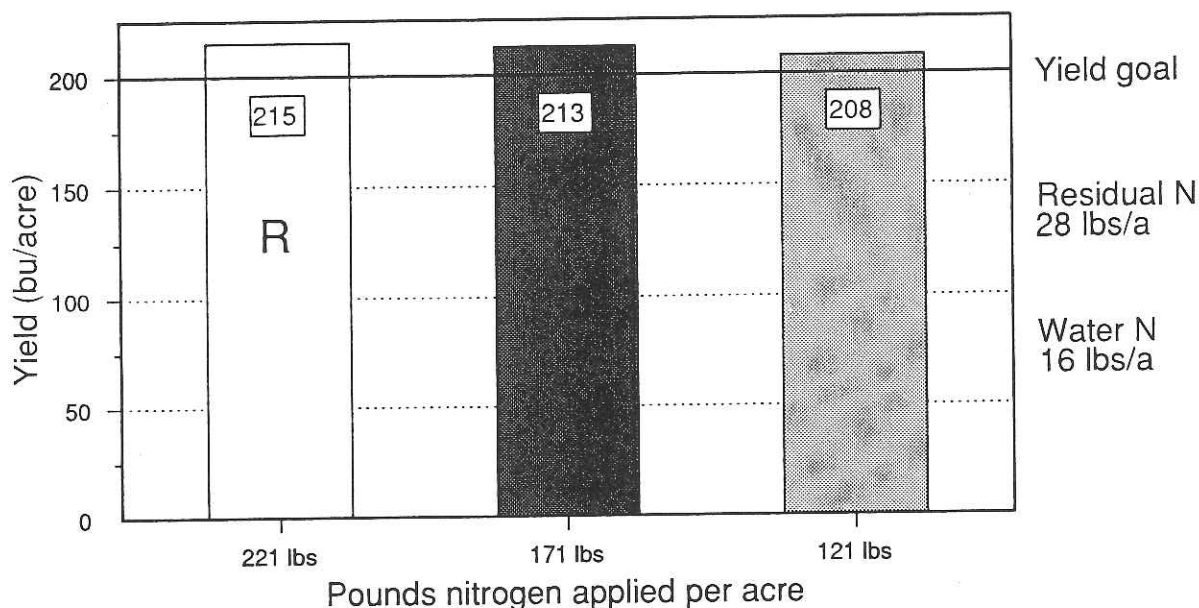


Curt used 5 lbs/acre of Dipel, over the top, with the hiller on June 10, to control first-generation ECB. One pint/acre of PennCap-M was applied by air on July 20 for second-generation ECB. Harvest population was counted at 26,500 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Yield results

Yield goal: 200 bu/acre

N required for yield goal: 264 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.8
OM	3.4 %
P	22 ppm
K	415 ppm
Zn	2.21 ppm

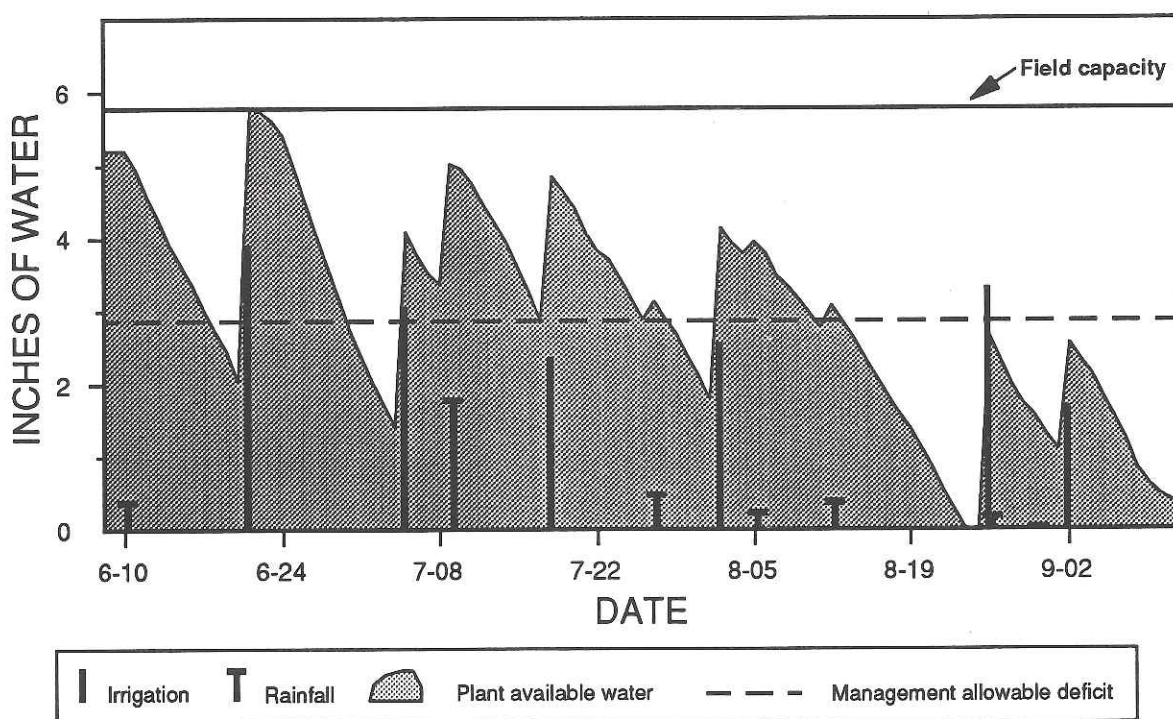
Treatment	-100	-50	Rec
N rate (lbs/acre)	121	171	221
Yield avg. (bu/acre)	208	213	215
Yield max. (bu/acre)	212	216	217
Yield min. (bu/acre)	200	210	214
Test wt. (lbs/bu)	58	58	58
Moisture (%)	15.6	15.8	15.6

* Cooperator elected not to apply the 50+ rate.

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
1990	10	25*	168	204
		36	218	204
		45	268	206
1991	16	37	121	208
		28	171	213
		49	221	215

* These numbers are an average of two cores taken top and bottom of each strip.

Irrigation information (surge)

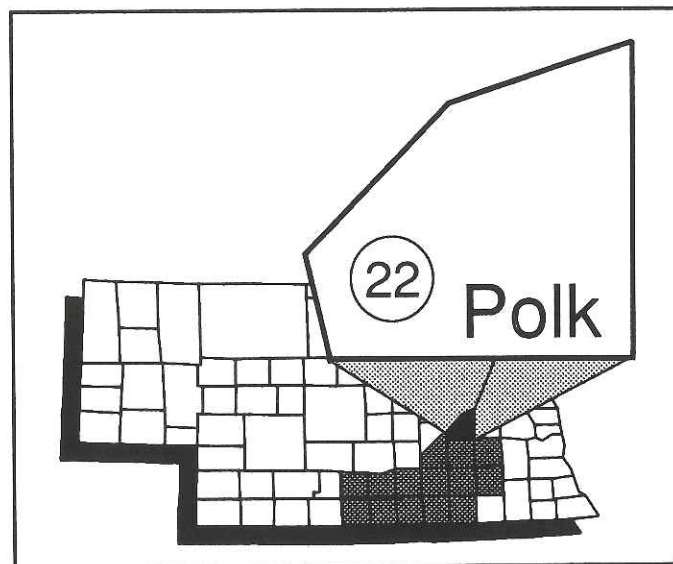


Site 22

Mark Newcomer - Polk County

Site 22 was located on the Mark Newcomer farm south and east of Stromsburg, Neb., in Polk County. Mark's site rotates between a corn/soybean rotation field and a continuous corn field. This year's plots were on the continuous corn field. The soil type is a Hastings silt loam with a 0-1 percent slope.

Shredding the stalks was the only field operation prior to planting. Mark fertilized with NH_3 as a sidedress application. Mark ridge planted Dekalb 612 at 26,000 seeds/acre on April 24, 1991 in 36-inch rows. Ramrod was used for weed control. No rootworm insecticide was used, however, Pounce was applied by air for the control of first-generation ECB.

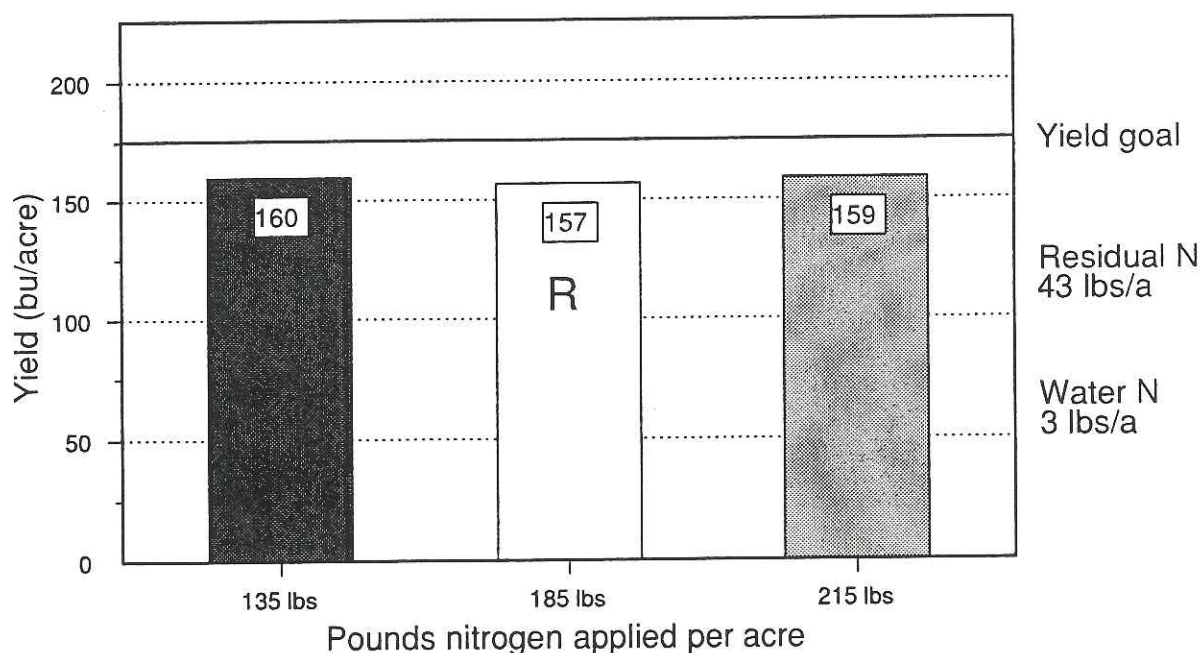


Harvest population counts were 22,250 plants/acre. Plot strips were fourteen rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperators.

Yield results

Yield goal: 175 bu/acre

N required for yield goal: 233 lbs/acre



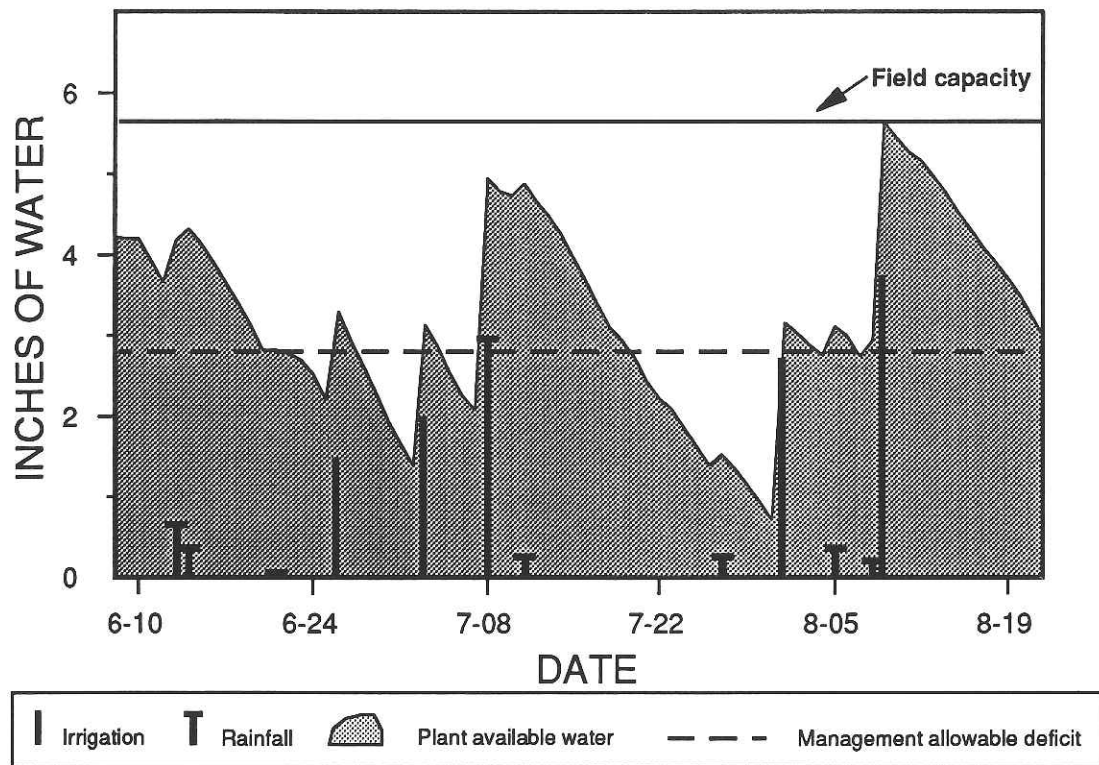
* R = the UN-L recommended rate

General Fertility	
pH	6.2
OM	3.3 %
P	29 ppm
K	461 ppm
Zn	1.48 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	135	185	215
Yield avg. (bu/acre)	160	157	159
Yield max. (bu/acre)	163	160	163
Yield min. (bu/acre)	153	152	154
Test wt. (lbs/bu)	57	57	58
Moisture (%)	14.3	14.2	14.4

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	Because Mark has a corn/soybean rotation on this plot, this information is not available.			

Irrigation information (surge)

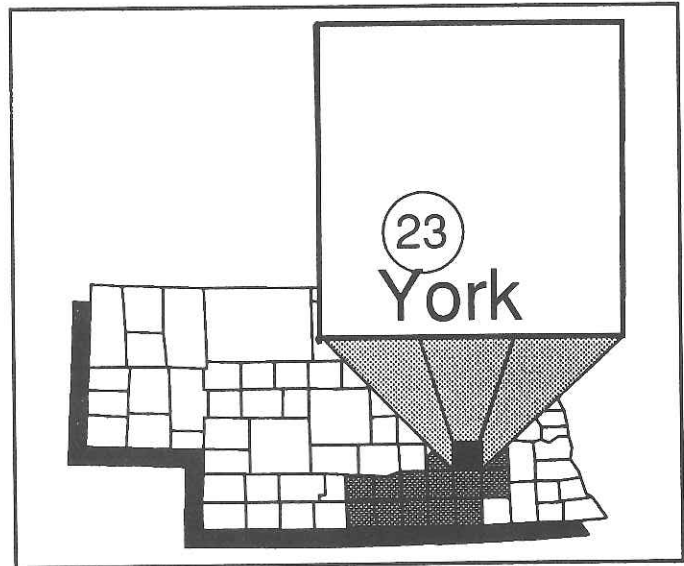


Site 23

Jerry Stahr - York County

Site 23 was located on the Jerry Stahr farm east of York, Neb., in York County. This pivot irrigated farm has been in continuous corn production. The soil type is a Hastings silt loam with a 0-1 percent slope.

To prepare for planting, Jerry placed NH_3 down the old row and shredded the stalks. Golden Harvest 2525 was planted at 28,300 seeds/acre on May 5, 1991 in 30-inch rows. He placed 5 gals/acre of 10-34-0, as a starter, in the seed furrow, and applied 1.5 pts/acre of Lariat in a 15-inch band for weed control. At first cultivation, 8.7 lbs/acre of Furadan 15G was dropped over the row for rootworm and first-brood ECB control. In mid-July, PennCap-M was applied for rootworm beetle control. Later in the season, a 1/2 rate of Capture was aerially applied for the control of spider mites.

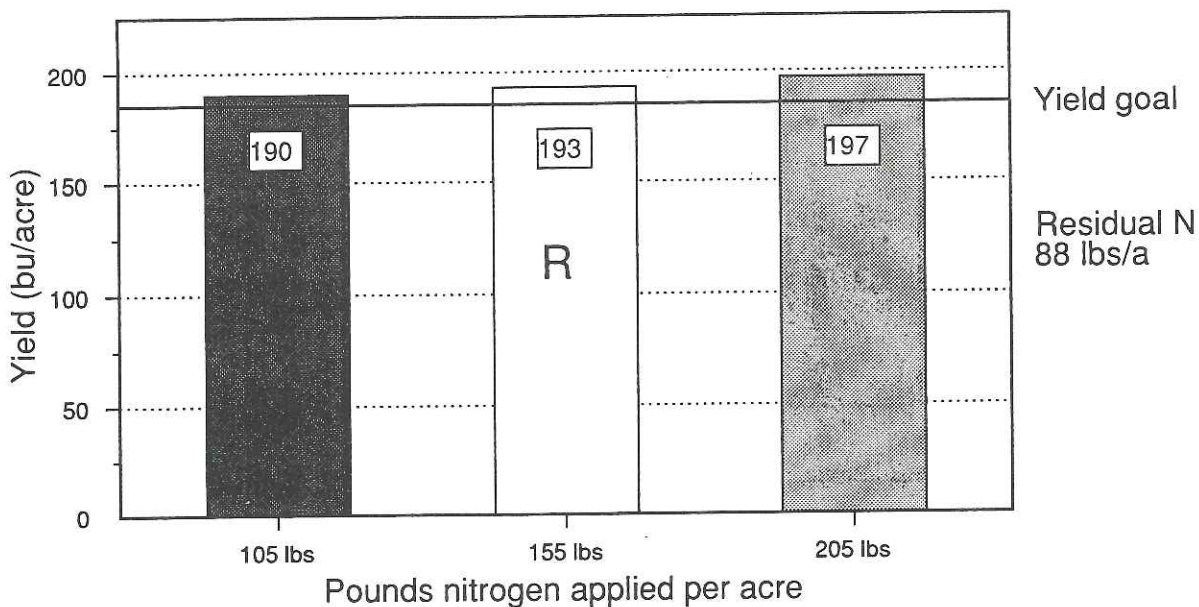


Harvest population was counted at 27,000 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Yield results

Yield goal: 185 bu/acre

N required for yield goal: 245 lbs/acre



* R = the UN-L recommended rate

1991 Report

General Fertility	
pH	6.5
OM	3.4 %
P	18 ppm
K	292 ppm
Zn	0.56 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	105	155	205
Yield avg. (bu/acre)	190	193	197
Yield max. (bu/acre)	193	199	200
Yield min. (bu/acre)	187	187	190
Test wt. (lbs/bu)	58	57	57
Moisture (%)	12.2	12.0	12.2

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Jerry's first year in this project.			

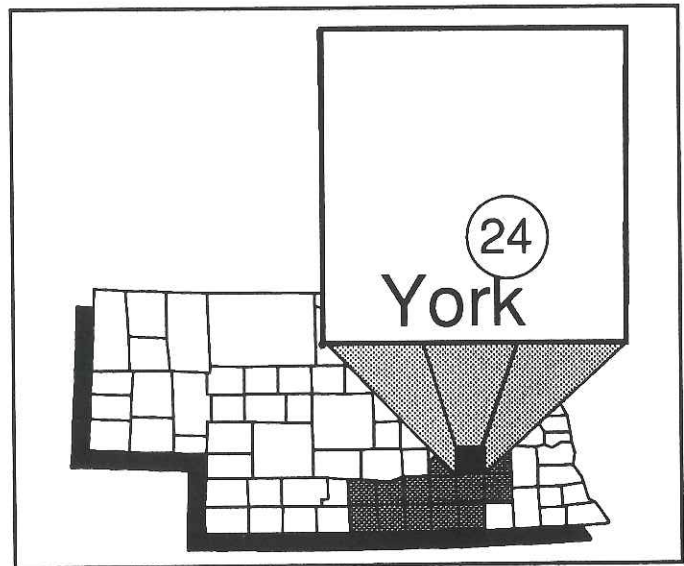
Irrigation information was not available from this site. _____

Site 24

Jerry Stahr - York County

Site 24 was located on the Jerry Stahr farm east of York, Neb., in York County. This gravity irrigated farm has been in continuous corn production. The soil type is a Hastings silt loam with a 0-1 percent slope.

To prepare for planting, Jerry placed NH_3 down the old row and shredded the stalks. Golden Harvest 2525 was planted at 28,300 seeds/acre on May 8, 1991 in 30-inch rows. He placed 5 gal/acre of 10-34-0, as a starter, in the seed furrow, and applied 1.5 pts/acre of Lariat in a 15-inch band for weed control. At first cultivation, 8.7 lbs/acre of Furadan 15G was dropped over the row for rootworm and first-brood ECB control. In mid-July, PennCap-M was applied for rootworm beetle control. Later in the season, a 1/2 rate of Capture was aerially applied for the control of spider mites.

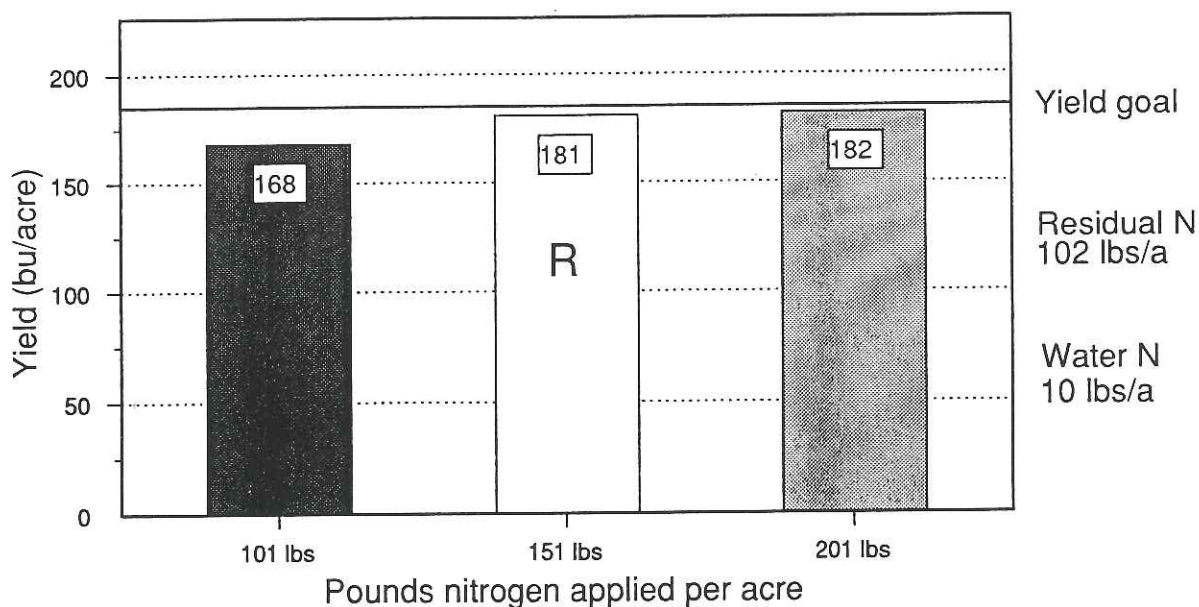


Harvest population was counted at 29,166 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperator.

Yield results

Yield goal: 185 bu/acre

N required for yield goal: 245 lbs/acre



* R = the UN-L recommended rate

1991 Report

General Fertility	
pH	6.5
OM	3.4 %
P	18 ppm
K	292 ppm
Zn	0.56 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	101	151	201
Yield avg. (bu/acre)	168	181	182
Yield max. (bu/acre)	177	200	194
Yield min. (bu/acre)	156	169	171
Test wt. (lbs/bu)	58	58	58
Moisture (%)	12.2	12.1	12.9

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Jerry's first year in this project.			

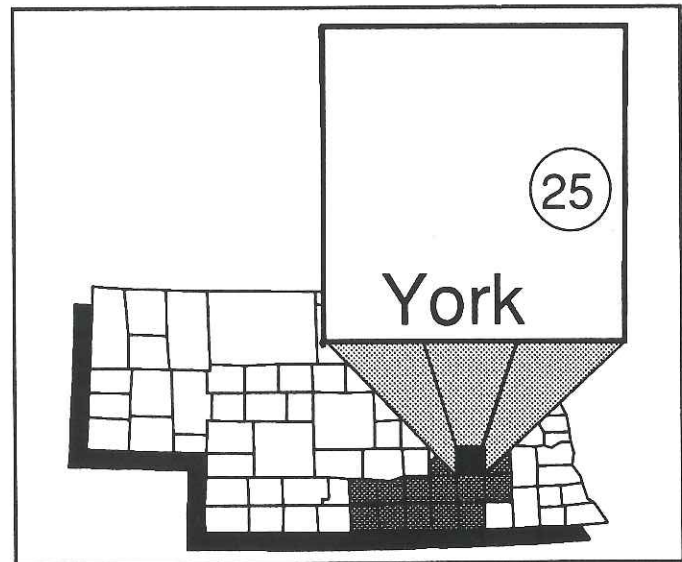
Irrigation information was not available from this site. _____

Site 25

Brad Rathje - York County

Site 25 was located on the Brad Rathje farm west of Waco, Neb., in York County. This gravity irrigated farm has been in continuous corn production. The soil type is a Hastings silt loam with a 0-1 percent slope.

Whole farm practices include disking prior to planting. Brad planted Funks G 4513 at 29,000 seeds/acre on April 26, 1991 in 36-inch rows. He used 44 lbs/acre of 10-30-0 liquid starter at planting. His herbicide program consisted of 1 pt/acre of Atrazine plus .75 pt/acre of Dual 8e in a 14-inch band at planting, as well as .75 pt/acre of Buctril in a 14-inch band on June 5. Furadan 20G, at a rate of 8.3 lbs/acre, was applied at first cultivation for rootworm and first-brood ECB moth control. Second-generation ECB was treated with 2 pts/acre of Penncap-M on July 14 and 2 pts/acre of Penncap-M on July 26.

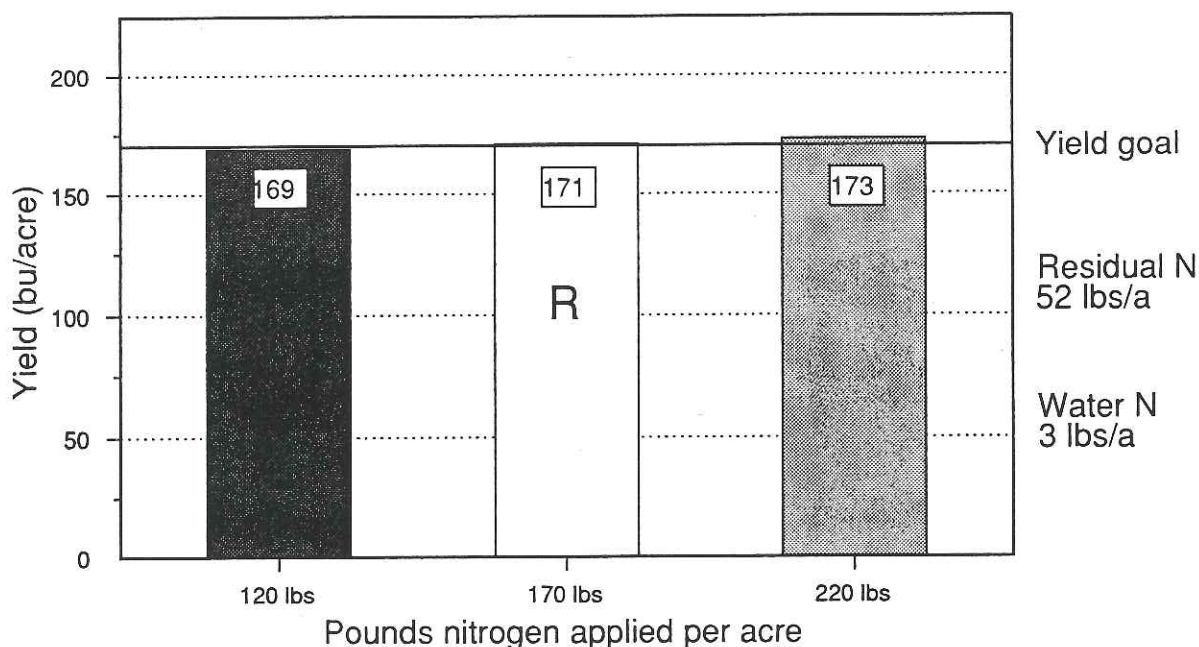


Brad split-applied the nitrogen on the plot strips. Five pounds of N were applied at planting, 45 pounds at first cultivation, and the balance at second cultivation. Harvest population counts were 24,375 plants/acre. Plot strips were twelve rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Yield results

Yield goal: 170 bu/acre

N required for yield goal: 227 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.8
OM	2.9 %
P	15 ppm
K	303 ppm
Zn	0.84 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	120	170	220
Yield avg. (bu/acre)*	169	171	173
Yield max. (bu/acre)	170	174	176
Yield min. (bu/acre)	168	168	170
Test wt. (lbs/bu)	59	58	58
Moisture (%)	12.7	12.7	12.6

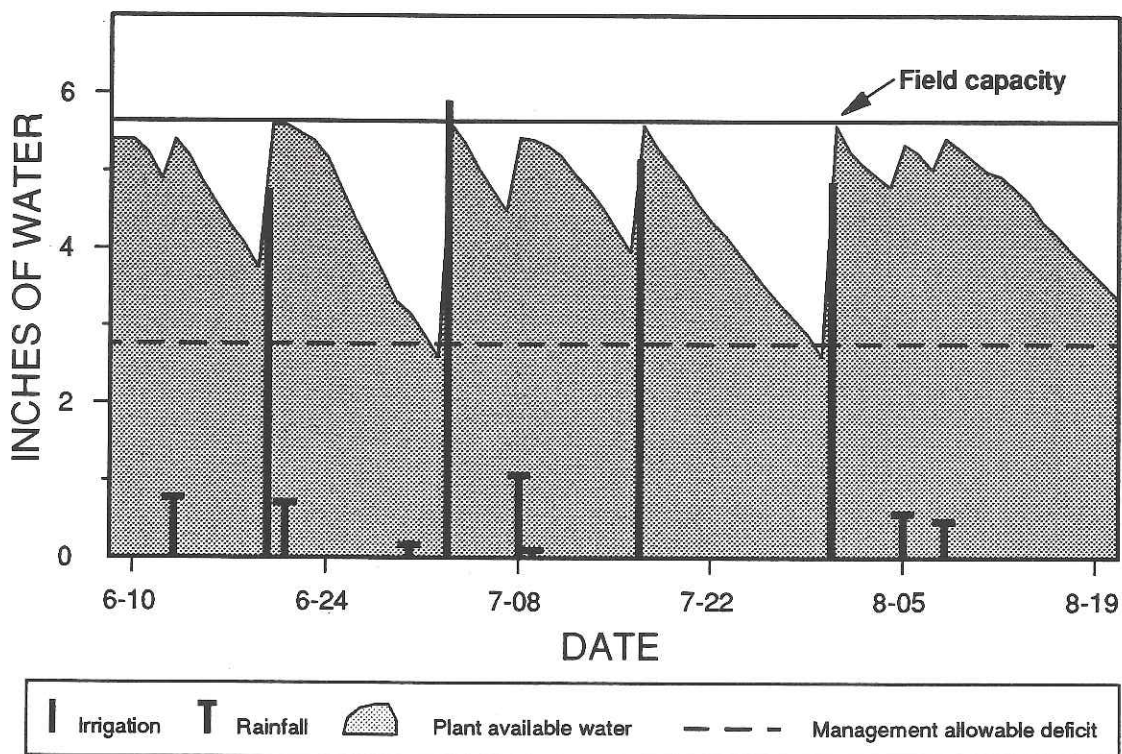
* Hail and wind damage reduced yields in 1991.

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
1990	0	43*	135	190
			185	192
			235	195
1991	3	31**	120	169
		52	170	171
		38	220	173

* This number is an average of 15 cores taken over the entire site.

** These numbers are an average of two cores taken top and bottom of each strip.

Irrigation information (conventional)

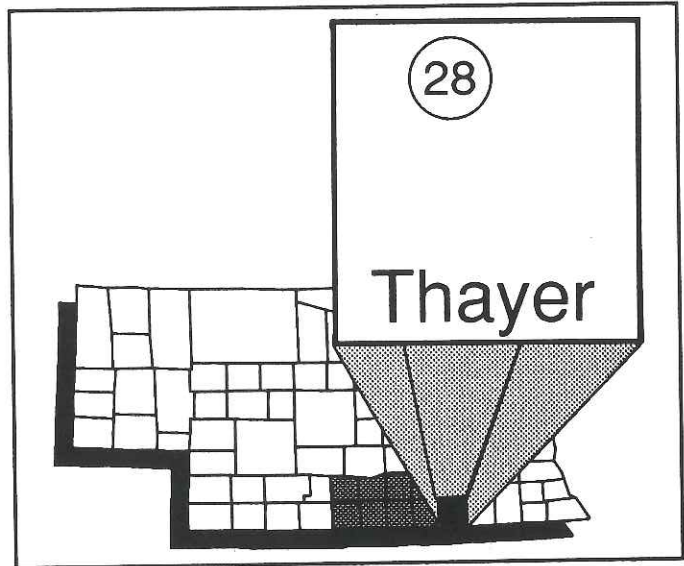


Site 28

Leroy Voss - Thayer County

Site 28 was located on the Leroy Voss farm west of Bruning, Neb., in Thayer County. This gravity irrigated farm has been in continuous corn production. The soil type is a Crete silt loam with a 0-1 percent slope.

Prior to planting, field operations included shredding stalks and fertilizing down the old row with NH_3 . Leroy ridge planted Pioneer 3162 at 30,000 seeds/acre on April 23, 1991 in 36-inch rows. Five gals/acre of 10-34-0 plus five gals/acre of 28-0-0 was applied with the planter. Weed control was achieved with a band application of 3 pts/acre of Bicep. First-generation ECB was treated with Thimet on June 18.

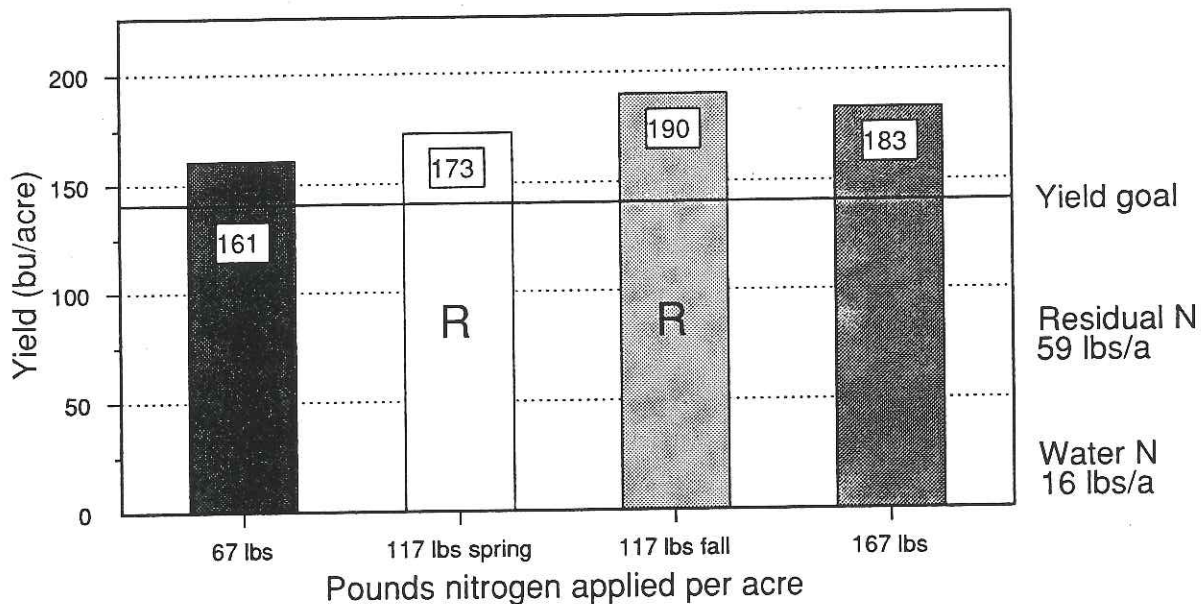


Harvest populations were counted at 27,000 plants/acre. Plot strips were eight rows wide, the length of the field. Three of the nitrogen treatments were applied in the spring. The fourth treatment was applied in the fall. The four treatments were replicated three times and were applied by the cooperater.

Yield results

Yield goal: 140 bu/acre

N required for yield goal: 192 lbs/acre



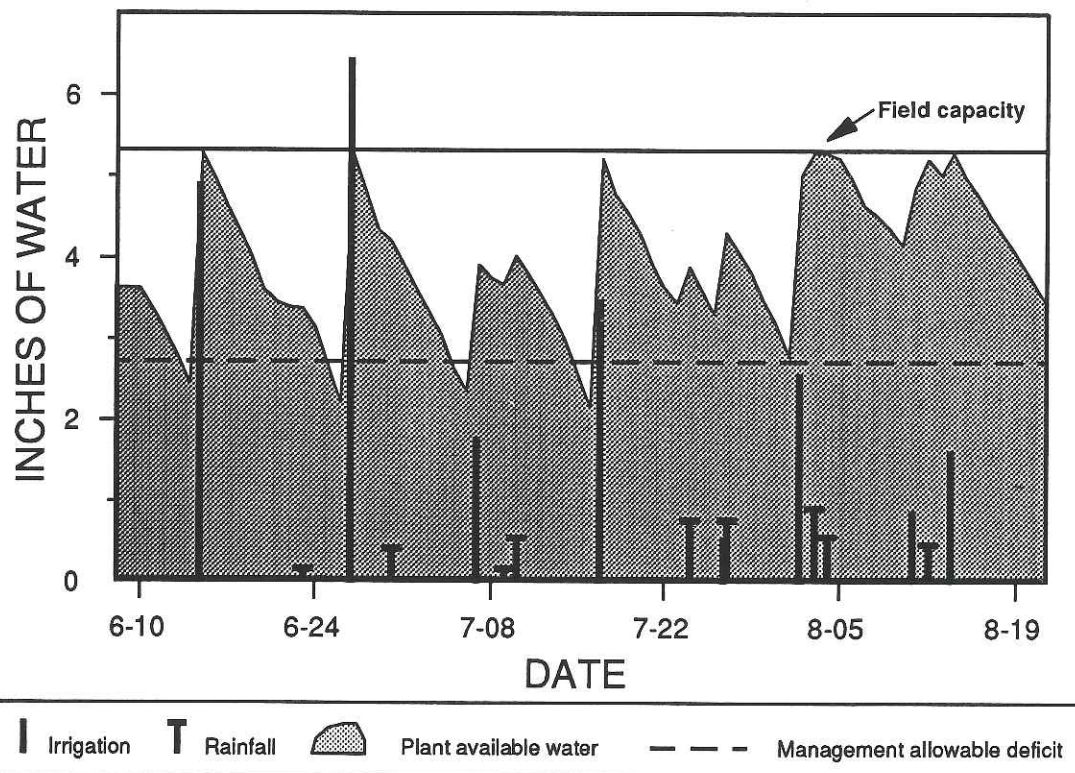
* R = the UN-L recommended rate

General Fertility	
pH	6.5
OM	3.6 %
P	19 ppm
K	269 ppm
Zn	3.47 ppm

Treatment	- Rec	Rec (spring)	Rec (fall)	+Rec
N rate (lbs/acre)	67	117	117	167
Yield avg. (bu/acre)	161	173	190	183
Yield max. (bu/acre)	174	174	195	189
Yield min. (bu/acre)	143	171	185	177
Test wt. (lbs/bu)	58	59	59	59
Moisture (%)	11.9	13.3	13.1	12.8

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Leroy's first year in this project.			

Irrigation information (conventional)

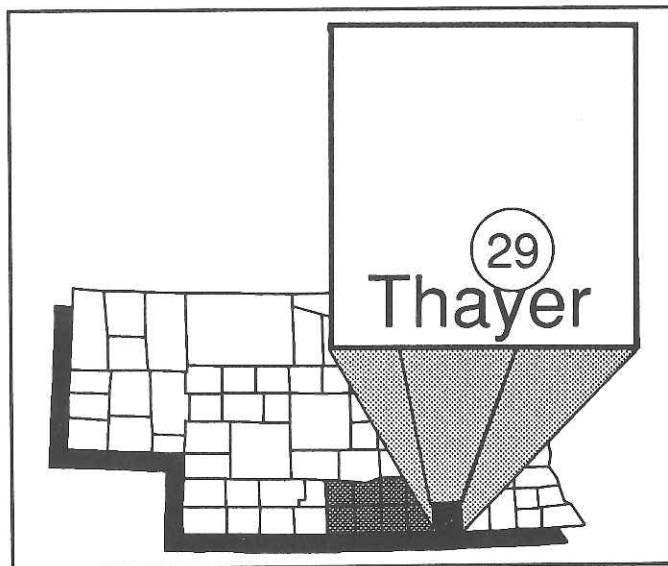


Site 29

Effenbeck Farms - Thayer County

Site 29 was located on the Effenbeck Farms field north of Chester, Neb., in Thayer County. This pivot irrigated field has been in continuous corn in the plot area. The soil type is a Crete silt loam with a 1-3 percent slope.

Field preparation included two diskings and a preplant application of NH_3 . This partnership planted Hoegemeyer 2691 at 26,200 seeds/acre on May 8, 1991 in 30-inch rows. They used 7.3 lbs/acre of Force insecticide at planting, as well as 3.6 gallons/acre of 10-34-0 starter. Three pts/acre of Lariat was applied at planting for weed control.

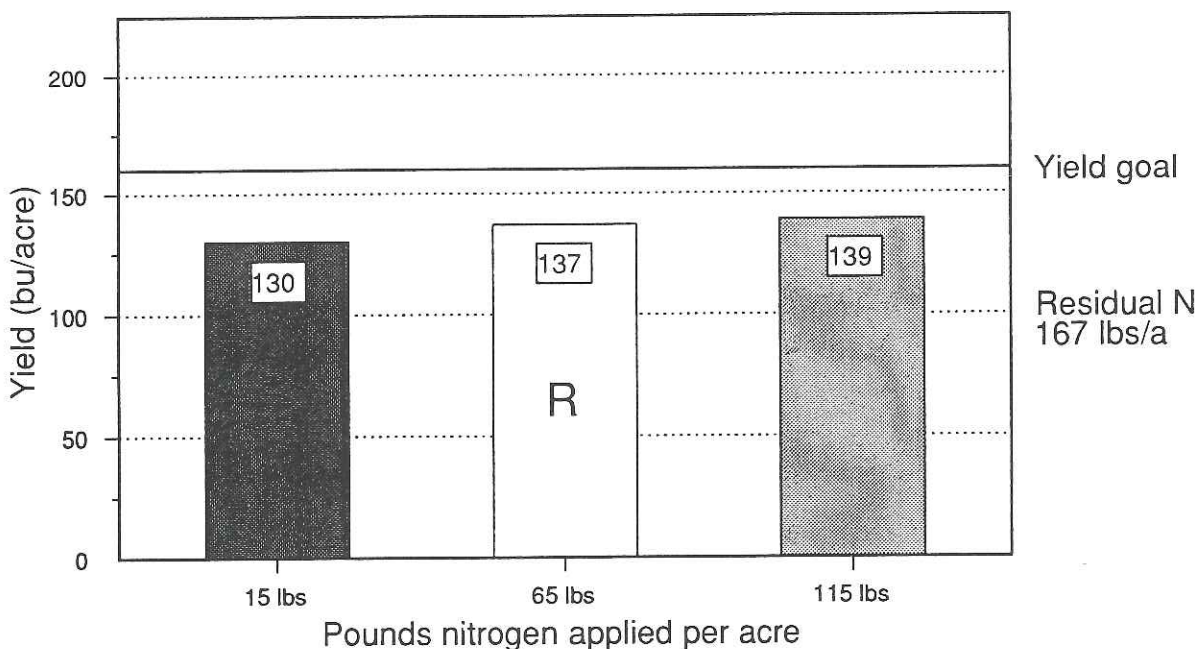


Harvest populations were counted at 26,750 plants/acre. Plot strips were twelve rows wide, one-half the length of the field. The three treatments were replicated four times and were applied by the cooperator as a sidedress application.

Yield results

Yield goal: 160 bu/acre

N required for yield goal: 215 lbs/acre



* R = the UN-L recommended rate

1991 Report

General Fertility	
pH	5.9
OM	2.8 %
P	12 ppm
K	180 ppm
Zn	0.88 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	15	65	115
Yield avg. (bu/acre)	130	137	139
Yield max. (bu/acre)	135	147	156
Yield min. (bu/acre)	124	125	133
Test wt. (lbs/bu)	58	58	58
Moisture (%)	12.5	12.6	12.5

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Effenbeck Farms' first year in this project.			

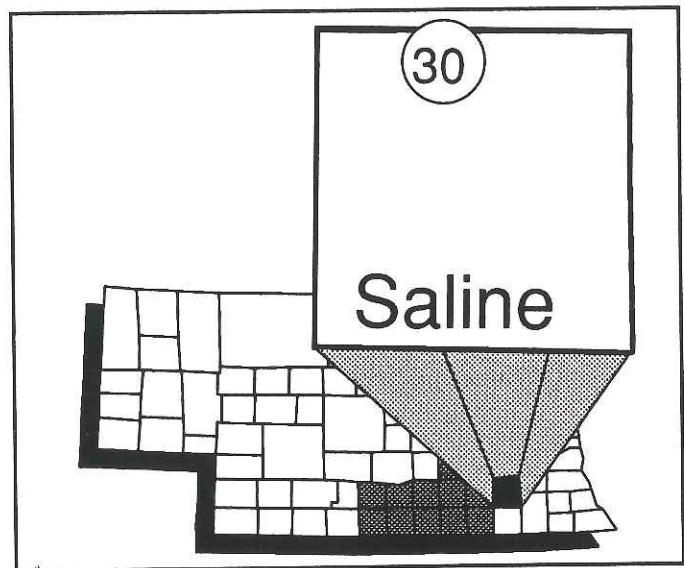
Irrigation information was not available from this site. _____

Site 30/1

Keith Spohn - Saline County

Site 30/1 was on the Keith Spohn farm located north and east of Friend, Neb., in Saline County. One of two plots under the same pivot-irrigated area, the nitrogen plot on this site was planted to corn in 1990 and again in 1991. The soil type is a Hastings silt loam with a 0-1 percent slope.

Planting preparations included two diskings and a field cultivation prior to planting. Keith planted Pioneer 3162 at 29,000 seeds/acre on April 30, 1991 in 30-inch rows. He also applied 8.5 lbs/acre of Force insecticide in furrow at planting. For weed control, Keith used a post-emergent application of Lariat at a rate of 3 qts/acre.

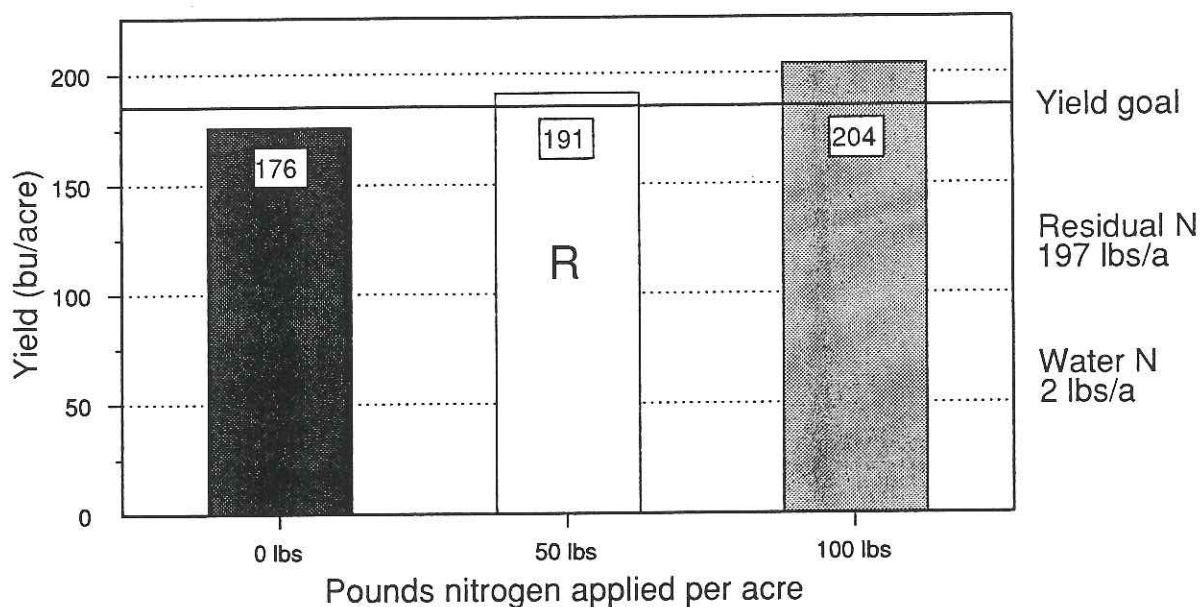


Harvest population was counted at 26,167 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Yield results

Yield goal: 185 bu/acre

N required for yield goal: 245 lbs/acre



* R = the UN-L recommended rate

General Fertility	
pH	6.1
OM	2.7 %
P	56 ppm
K	408 ppm
Zn	3.41 ppm
S	8 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	0	50	100
Yield avg. (bu/acre)	176	191	204
Yield max. (bu/acre)	188	195	207
Yield min. (bu/acre)	165	182	197
Test wt. (lbs/bu)	62	62	62
Moisture (%)	15.2	15.0	15.3

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Keith's first year in this project.			

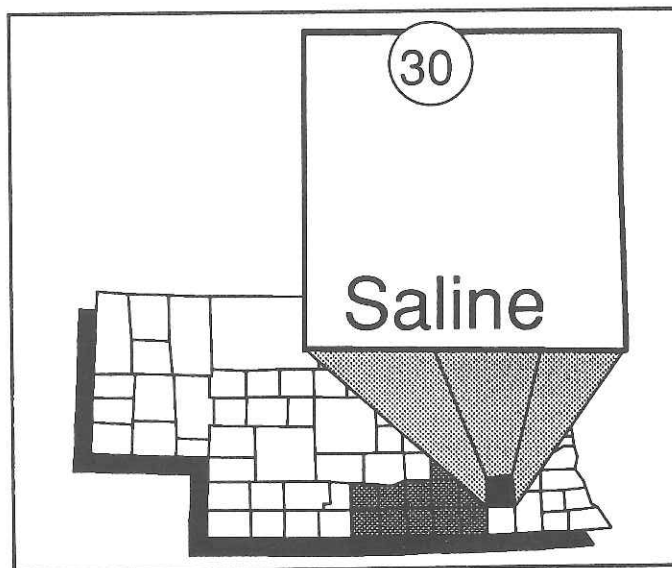
Irrigation information was not available from this site. _____

Site 30/2

Keith Spohn - Saline County

Site 30/2 was the second site on the Keith Spohn farm located north and east of Friend, Neb., in Saline County. The nitrogen plot area on this part of Keith's pivot-irrigated farm was planted to soybeans in 1990, corn in 1991. The soil type is a Hastings silt loam with a 0-1 percent slope.

Planting preparations included two diskings and a field cultivation prior to planting. Keith planted Pioneer 3162 at 29,000 seeds/acre on April 30, 1991 in 30-inch rows. For weed control, Keith used a post-emergent application of Lariat at a rate of 3 qts/acre.

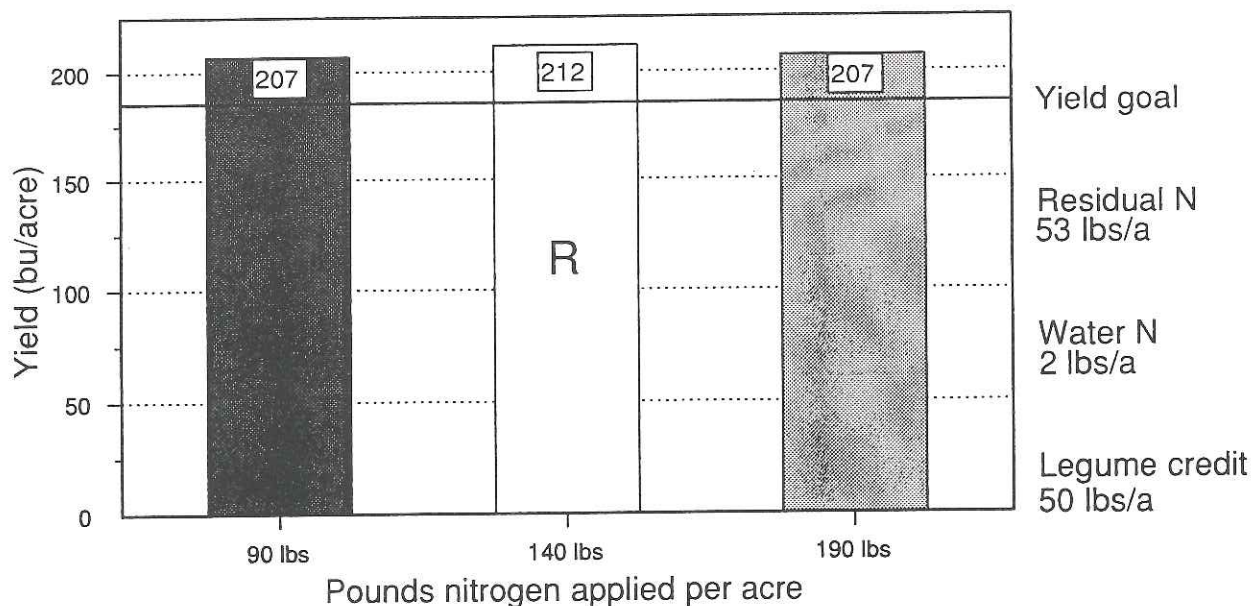


Harvest population was counted at 26,167 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperators.

Yield results

Yield goal: 185 bu/acre

N required for yield goal: 245 lbs/acre



* R = the UN-L recommended rate

1991 Report

General Fertility	
pH	6.3
OM	2.6 %
P	54 ppm
K	361 ppm
Zn	2.85 ppm
S	8 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	90	140	190
Yield avg. (bu/acre)	207	212	207
Yield max. (bu/acre)	212	215	211
Yield min. (bu/acre)	203	207	202
Test wt. (lbs/bu)	61	61	61
Moisture (%)	15.7	15.3	15.7

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Keith's first year in this project.			

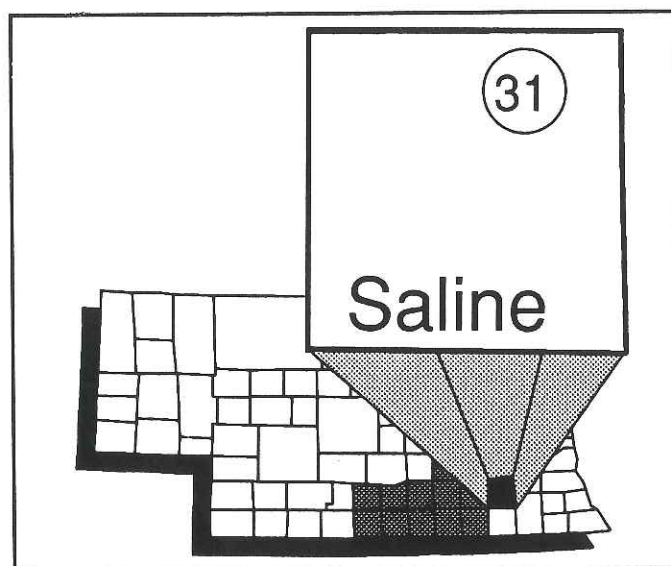
Irrigation information was not available from this site. _____

Site 31

Wayne Hansen - Saline County

Site 31 was located on the Wayne Hansen farm north of Dorchester, Neb., in Saline County. The plot area has been in continuous corn production, while other parts of the farm have been in a corn/soybean rotation. The soil type is a Crete silt loam with a 0-1 percent slope.

Wayne uses ridge till for planting; therefore, he only shredded stalks and knifed in NH_3 prior to planting. Jacques 8210 was planted on April 27, 1991 in 30-inch rows. Six gals/acre of 10-34-0 was placed 2 inches to the side of the seed furrow as a starter. Thimet 20G, at 6.5 lbs/acre, was applied at first cultivation. One pt/acre of Lasso plus one qt/acre of Atrazine was banded at planting for weed control. At the five-leaf stage, .5 pt/acre of Buctril plus .5 pt/acre of Atrazine plus .2 pt/acre of Banvel was broadcast applied.

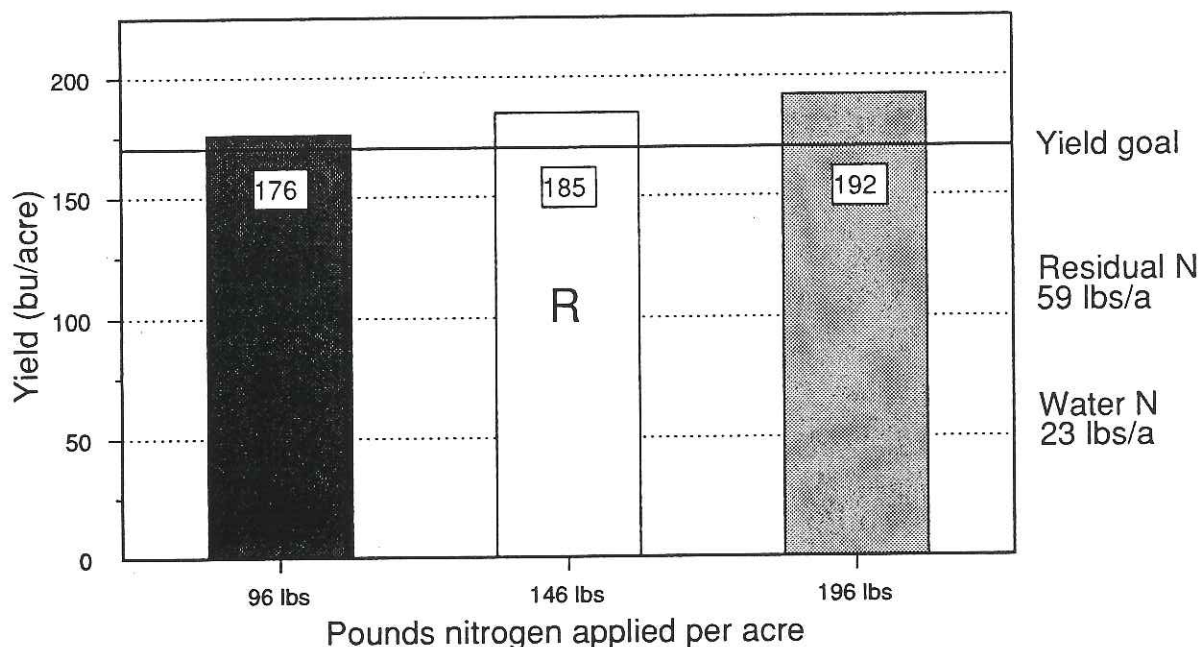


Harvest population was counted at 24,250 plants/acre. Plot strips were twelve rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Yield results

Yield goal: 170 bu/acre

N required for yield goal: 227 lbs/acre



* R = the UN-L recommended rate

1991 Report

General Fertility	
pH	6.6
OM	3.3 %
P	56 ppm
K	432 ppm
Zn	3.77 ppm
S	8 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	96	146	196
Yield avg. (bu/acre)	176	185	192
Yield max. (bu/acre)	187	192	201
Yield min. (bu/acre)	160	174	185
Test wt. (lbs/bu)	57	57	57
Moisture (%)	18.5	18.7	17.5

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Wayne's first year in this project.			

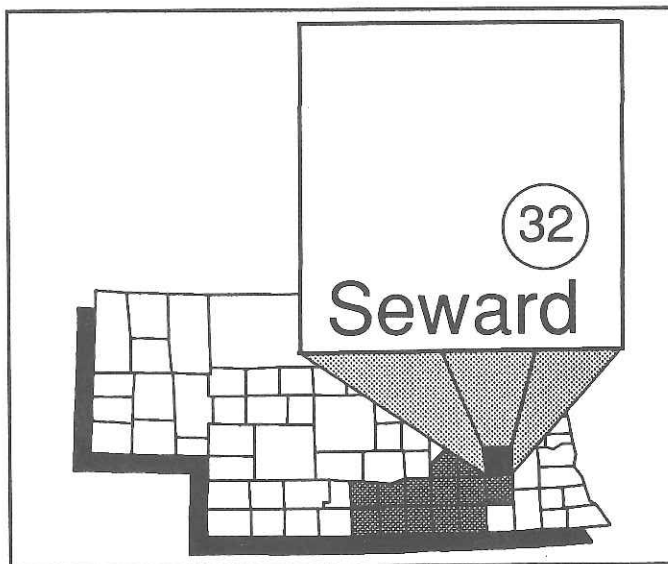
Irrigation information was not available from this site. _____

Site 32

Dean Rucker - Seward County

Site 32 is located on the Dean Rucker Farm east of Tamora, Neb., in Seward County. This gravity irrigated farm has been in continuous corn production. The soil type is a Fillmore silt loam with a 0-1 percent slope.

Soil preparation included two diskings; once in the fall, and once in the spring. NH_3 was knifed in. Dean planted George's 6112 at 28,000 seeds/acre on April 30, 1991 in 36-inch rows. Starter fertilizer in a 10-34-0 + Zn formulation was applied at a rate of five gals/acre in the seed furrow. Herbicides banded at planting were 1 qt Atrazine plus 1 pt Lasso per acre. Prior to cultivation, 1.4 qt/acre of Laddock was sprayed in a band over the row. Five lbs/acre of Counter 20 CR, in furrow, was applied at planting for rootworm control. First-generation ECB was controlled with 1.1 pt/acre of Dipel sprayed over the whorl. Two pts/acre of PennCap-M was sprayed by air for second-generation ECB.

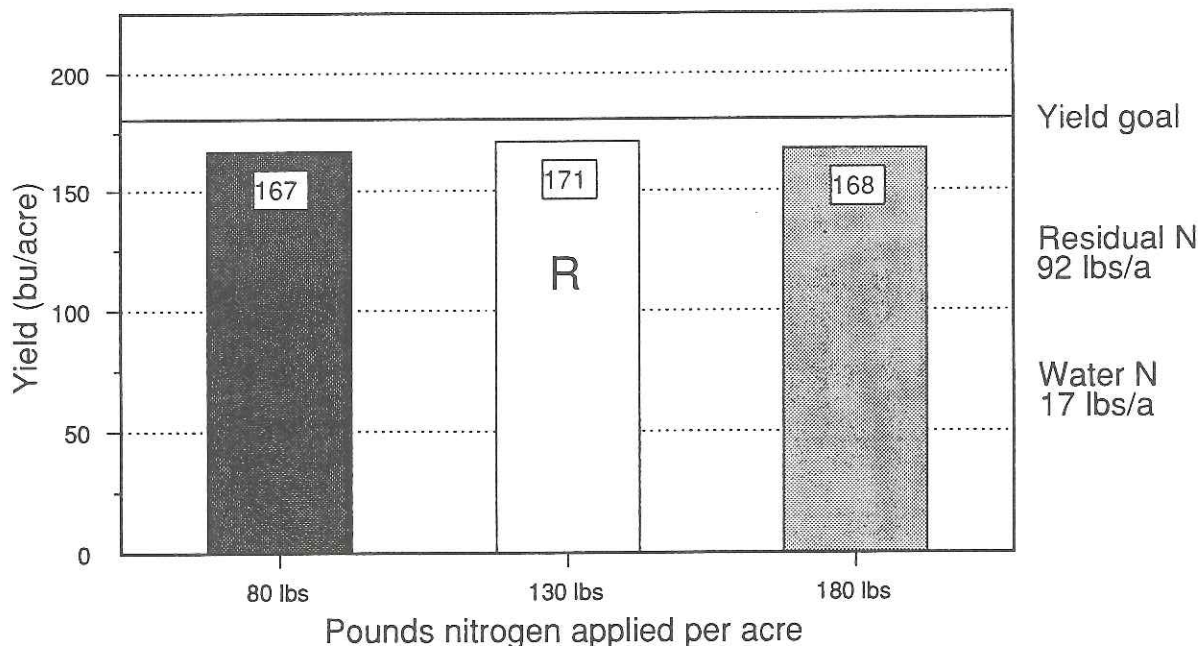


Harvest populations were counted at 22,333 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperator in a sidedress application.

Yield results

Yield goal: 180 bu/acre

N required for yield goal: 239 lbs/acre



* R = the UN-L recommended rate

1991 Report

General Fertility	
pH	5.8
OM	3.1 %
P	16 ppm
K	385 ppm
Zn	1.01 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	80	130	180
Yield avg. (bu/acre)	167	171	168
Yield max. (bu/acre)	171	176	174
Yield min. (bu/acre)	164	165	163
Test wt. (lbs/bu)	59	59	59
Moisture (%)	14.7	14.2	14.4

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Dean's first year in this project.			

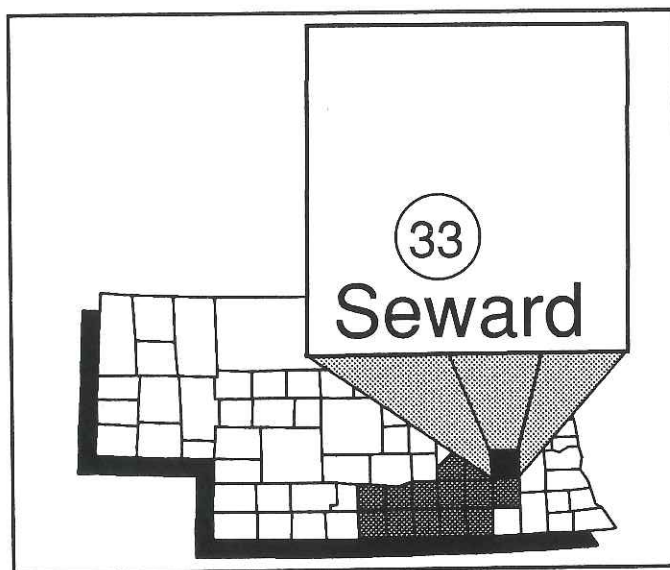
Irrigation information was not available from this site. _____

Site 33

Doug Cast - Seward County

Site 33 was located on the Doug Cast farm south and east of Utica, Neb., in Seward County. This gravity irrigated farm has been in continuous corn production. The soil type is a Fillmore silt loam with a 0-1 percent slope.

Doug shreds the stalks and fertilizes down the old row with NH_3 prior to planting. NC+ 4616 was ridge planted at 24,600 seeds/acre on April 29, 1991 in 30-inch rows. At the same time, Doug placed four gals/acre of 10-34-0 in the seed furrow. Thimet 15-G, at the rate of 8.7 lbs/acre, was used at lay-by. He broadcast 3.5 pts/acre of Marksman on May 16 for weed control.

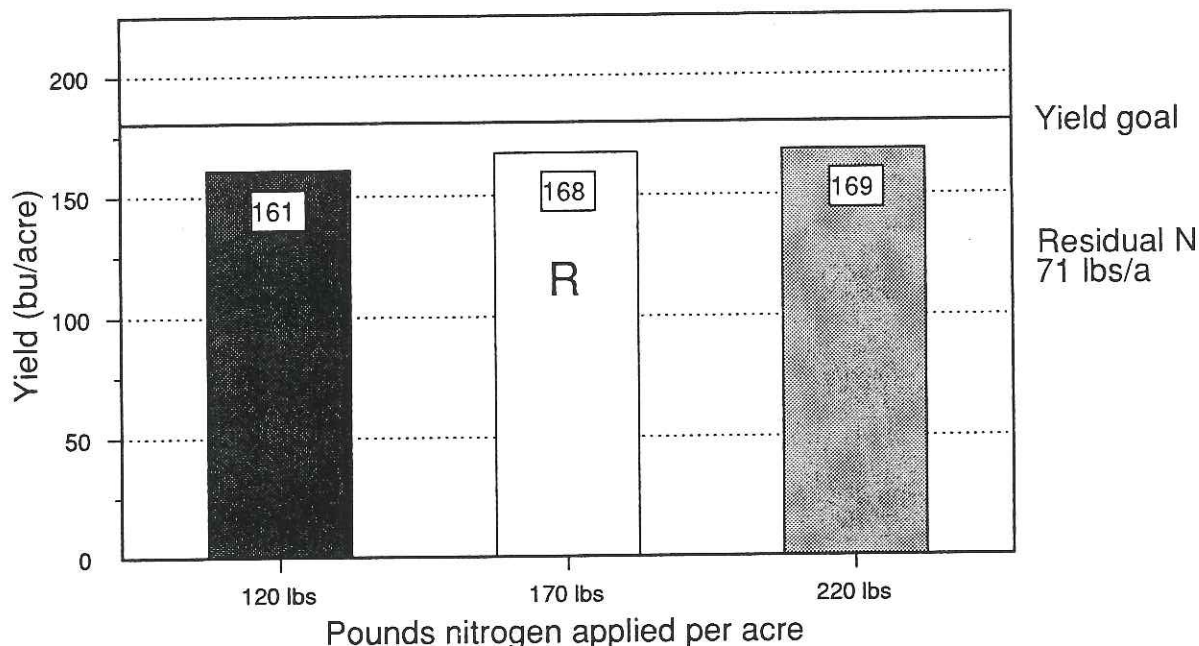


Harvest populations were counted at 22,250 plants/acre. Plot strips were eight rows wide, the length of the field. The three treatments were replicated four times and were applied by the cooperater.

Yield results

Yield goal: 180 bu/acre

N required for yield goal: 239 lbs/acre



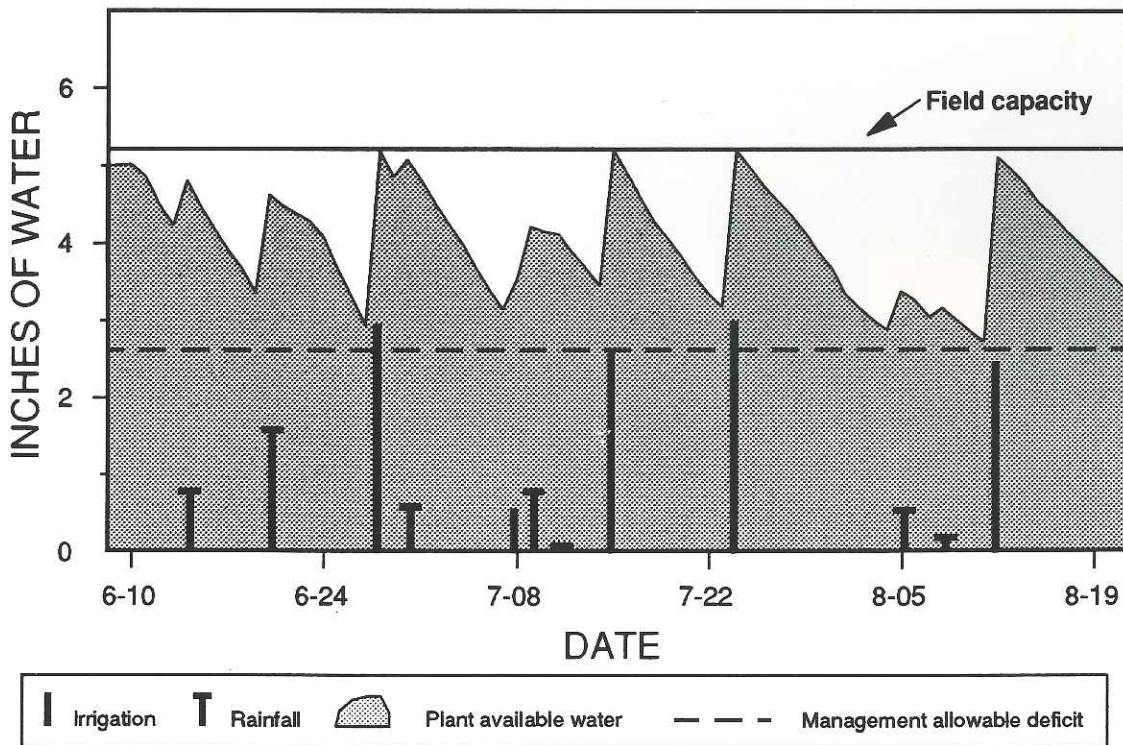
* R = the UN-L recommended rate

General Fertility	
pH	6.7
OM	2.9 %
P	24 ppm
K	431 ppm
Zn	2.30 ppm

Treatment	- Rec	Rec	+ Rec
N rate (lbs/acre)	120	170	220
Yield avg. (bu/acre)	161	168	169
Yield max. (bu/acre)	169	172	171
Yield min. (bu/acre)	152	161	166
Test wt. (lbs/bu)	56	56	57
Moisture (%)	13.7	13.9	13.7

Year	Water N (lbs/acre)	Soil Res-N (lbs/acre)	N applied (lbs/acre)	Yield (bu/acre)
	This was Doug's first year in this project.			

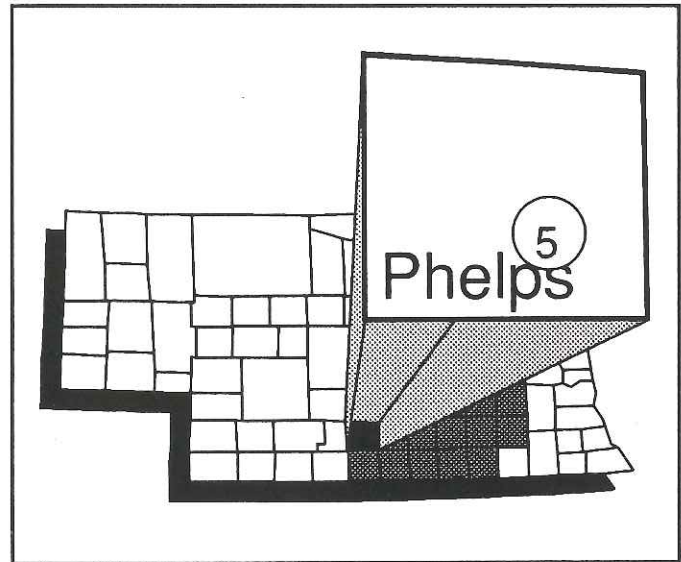
Irrigation information (conventional)



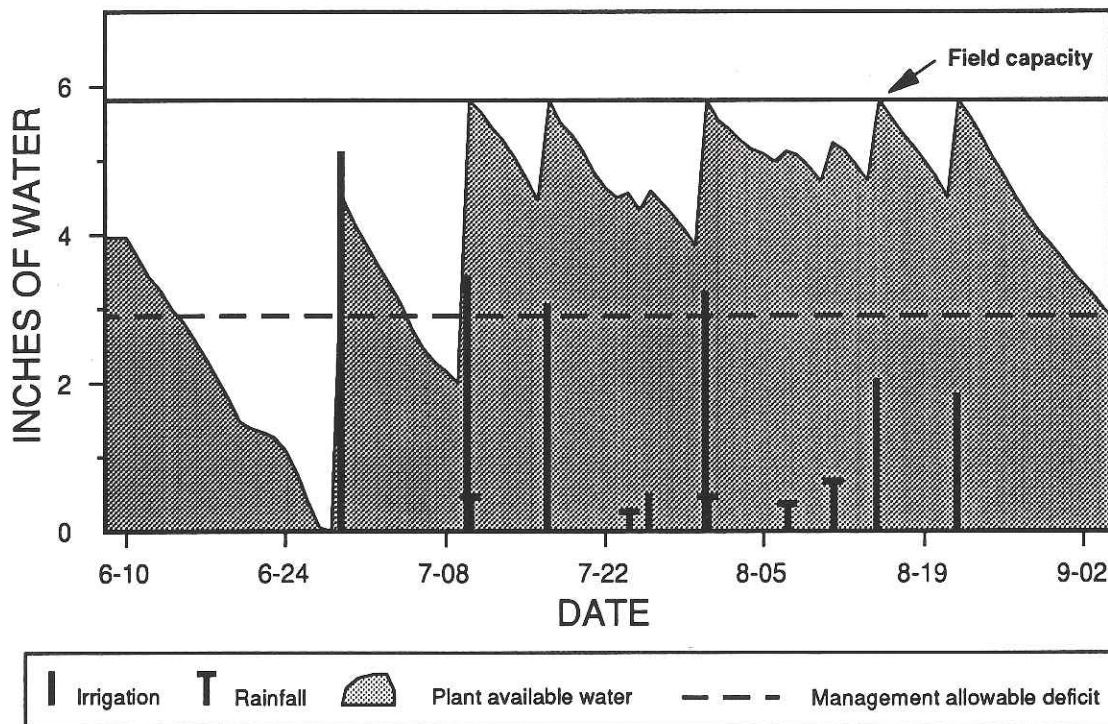
The following cooperators collected only irrigation information on their sites.

Site 5

Bruce Anderson
Phelps County

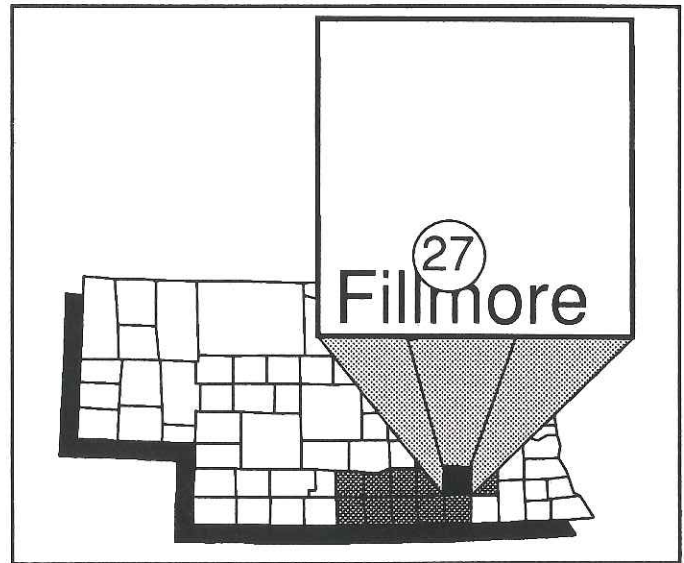


Surge Irrigation Information



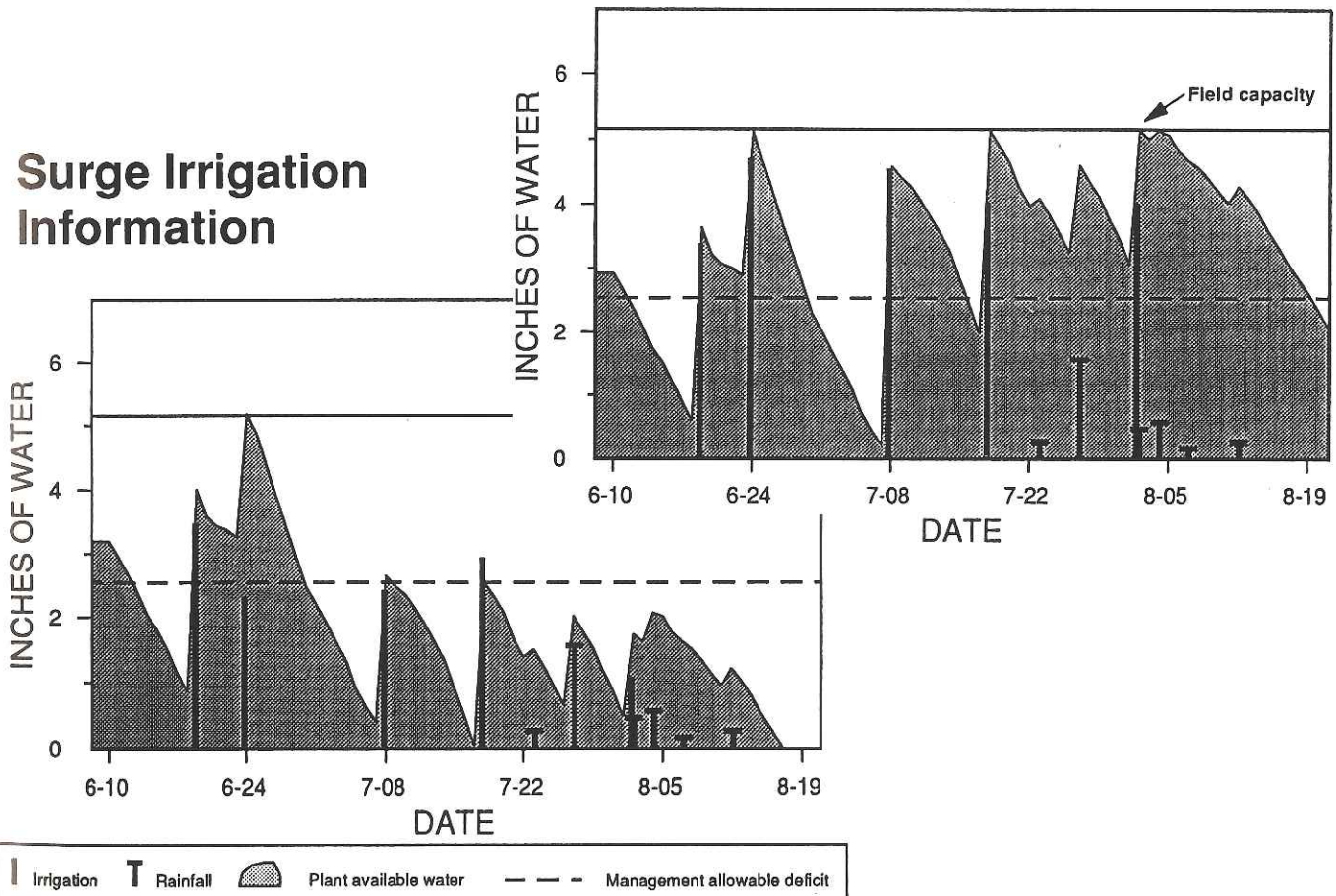
Site 27

Jim Bedlan
Fillmore County



Conventional Irrigation Information

Surge Irrigation Information



Who to contact in your area for more information...

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Ken Franzen, SCS, 2727 W. 2nd, Suite 102, Hastings 68901, 462-5412
Paul Swanson, CE, P.O. Box 30, Hastings 68901, 461-7209
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Cooperators:

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Larry Christenson, Rural Route, Campbell, NE 68932, 756-5363
Myles Ramsey, Rt. 1, Box 83, Kenesaw, NE 68956, 752-8134
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Cooperators:

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Tom Dorn, CE, 972 G. St., Geneva 68361, 759-3712
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James Shelton, ASCS, Box 126, Franklin 68939, *425-6234

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Kelly Grossnicklaus, ASCS, Box 148, Aurora 68818, 694-3122

Cooperators:

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Carey Friesen, Rural Route, Henderson, NE 68371, 723-4260
Clayton Higgins, RR 1, Giltner, NE 68841, 849-2216

*Area Code 308, all others Area Code 402

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Tony Anderson, CE, Box 258, Alma 68920, *928-2119

Lee Christenson, ASCS, Box 410, Alma 68920, *928-2172

Cooperators:

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Alan Corr, CE, Box 31, Minden 68959, *832-1155

Richard Booker, ASCS, Box 240, Minden 68959, *832-2280

Cooperators:

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Dave Nielsen, Rt 2, Box 10, Minden, NE 68959, *832-0556

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Steve Melvin, CE, Box 386, Nelson 68961, 225-2381

Dale Kovanda, ASCS, Box 367, Nelson 68961, 225-3401

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Lale Oellerich, RR 2, Davenport, NE 68335, 364-2379

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Roland Cooksley, CE, 1308 2nd St., Holdrege 68949, *995-4222

Kevin Pesek, ASCS, Box 201, Holdrege 68949, *995-6121

Cooperators:

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Ilene Anderson, ASCS, Box 237, Osceola 68651, 747-2111

Cooperators:

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Randy Pryor, CE, Box 978, Wilber 68465, 821-2151
Vern Anthony, ASCS, Box 686, Wilber 68465, 821-2251

Cooperators:

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Keith Spohn, Rural Route 1, Friend, NE 68359, 947-8061

Seward County

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Marvin Sefrna, CE, 216 South 9th St., Seward 68434, 643-2981
Bruce Thompson, ASCS, Box 389, Seward 68434, 643-4586

Cooperators:

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Dean Rocker, RR 2, Box 164, Seward, NE 68434, 643-2318

Thayer County

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Steve Melvin, CE, Hebron 68370, 768-7212
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Cooperators:

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Leroy Voss, Rural Route 1, Bruning, NE 68322, 353-3805

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Jurdan Counts, CE, Red Cloud 68970, 746-3417
Robert Bohrer, ASCS, Box 487, Red Cloud 68970, 746-2204

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Gary Zoubek, CE, RFD 4, Box 46, York 68467, 362-5508
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