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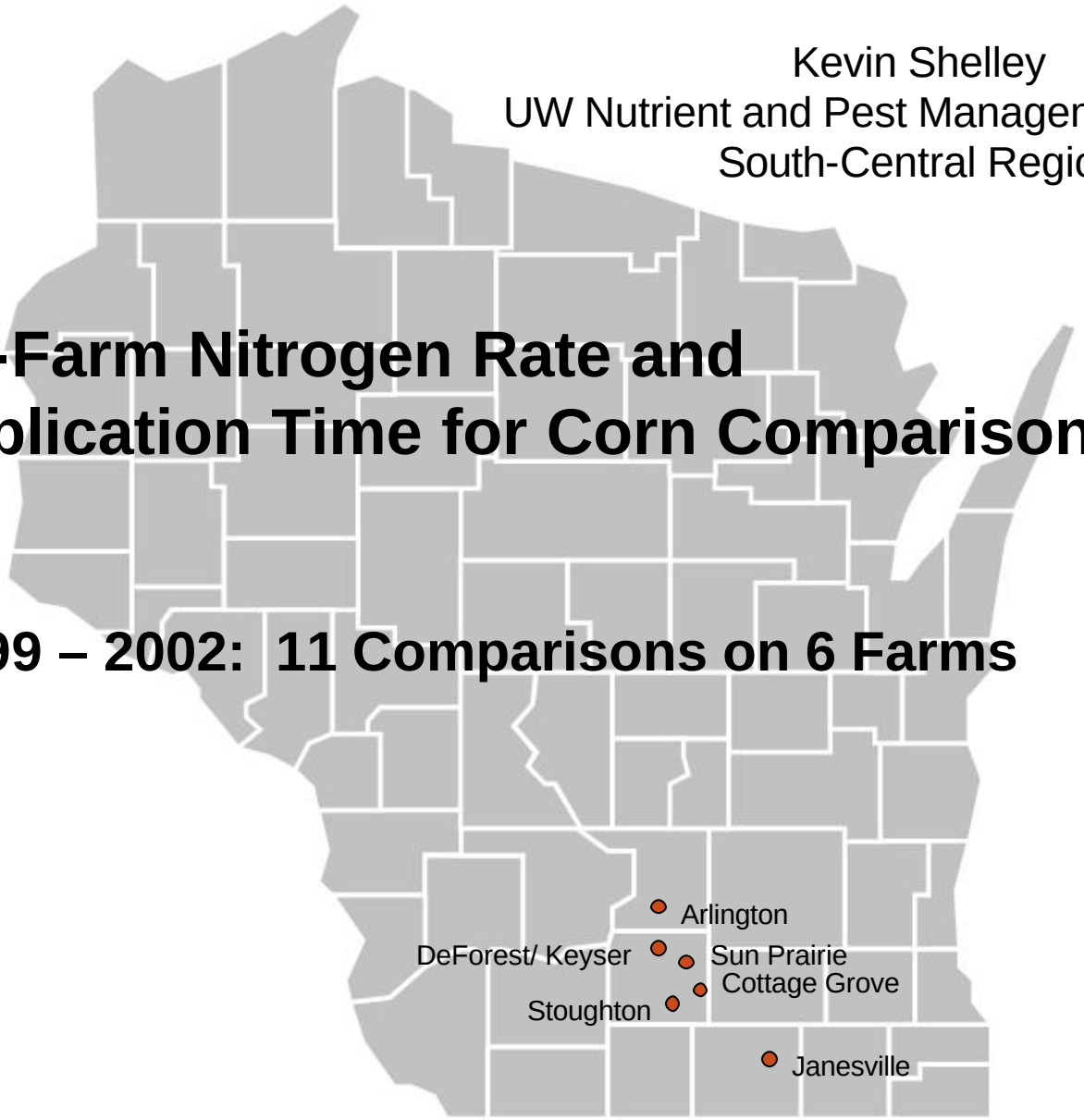
On-Farm Nitrogen Rate and Application Time for Corn Comparisons

1999 – 2002: 11 Comparisons on 6 Farms



Objectives

- Help farmers, crop advisors, resource managers and others evaluate UWEX recommendations for managing nitrogen for corn for grain in SC WI.
  - Application rates
  - Times of application

  Address trends toward increased rates and fall applications

Methods

- Side-by side, field length comparisons;
- Comparisons involve:
  - Nitrogen rates at, above and below UWEX recommendations;
  - various combinations of fall, spring preplant and sidedress applications.
- Corn grown in grain crop rotations;
- Top agronomic management;
- Well-calibrated and controlled N application equipment.


DeLong's

Arlington, 1999 Corn after corn; Plano silt loam, 4.1% OM

Reps	Preemerge N (28% UAN)	Sidedress N (28% UAN)	Total N (lbs/acre)	Average Yield (bu/acre)	Marginal* Return ($/acre)
3	90	30	120	183.1	325.05
3	90	60	150	185.9	323.01
3	90	100	190	188.8	318.66
3	180	0	180	188.8	323.16

* Corn price = $1.95/bu; N = $.25/lb; Addl cost for N applied at cultivation = $2/acre

Arlington, 2000 Corn after corn; Sable silty clay loam >2.0% OM

Reps	Preemerge N (28% UAN)	Sidedress N (28% UAN)	Total N (lbs/acre)	Average Yield (bu/acre)	Marginal* Return ($/acre)
3	90	30	120	148.4	279.64
3	90	60	150	170.4	318.34
3	150	0	150	145.6	268.26
3	180	0	180	149.5	268.95

* Corn price = $2.10/bu; N = $.25/lb; Addl cost for N applied at cultivation = $2/acre

Arlington, 2001 Corn after corn; Plano silt loam, 4.1% OM

Reps	Preplant N (46-0-0 & 28% UAN)	Sidedress N (28% UAN)	Total N (lbs/acre)	Average Yield (bu/acre)	Marginal* Return ($/acre)
3	90	30	120	190.5	330.86
3	90	60	150	192.3	325.80
3	150	0	150	192.0	330.35
3	180	0	180	190.4	320.41

* Corn price = $1.90/bu; N = $.23/lb (pre N), $.28/lb (sidedress N); Addl application cost for N at cultivation = $2/acre

Sun Prairie, 2001

Corn after soybeans; Ringwood silt loam, 3.2% OM

Reps	Preplant N (82-0-0)	Sidedress N (28% UAN)	Total N (lbs/acre)	Average Yield (bu/acre)	Marginal* Return ($/acre)
2	0	120	120	214.8	370.12
2	0	150	150	210.0	352.00
3	150	30	180	206.5	341.85

* Corn price = $1.90/bu; N = $.23/lb (82-0-0), $.30/lb (28% UAN);
Preplant N application = $5/acre; sidedress N application at cultivation = $2/acre

Sun Prairie, 2002 Corn after corn; Ringwood silt loam=3.2% OM

Reps	Preplant N (82-0-0)	Sidedress N (28% UAN)	Total N (lbs/acre)	Average Yield (bu/acre)	Marginal* Return ($/acre)
2	0	150	150	186.2	384.45
2	0	172	172	188.2	384.33
2	160	0	160	208.2	438.85
2	160	21	181	204.1	423.22

* Corn price = $2.25; N = $.16/lb (82-0-0), $.21/lb (28% UAN);
Preplant N application = $4/acre; sidedress N application at cultivation = $2-3/acre

2002 Growing Season Precipitation (inches/month)

	April	May	June	July	August	Sept.	Octob.
Arlington Res. Sta.	3.24	2.94	4.32	2.90	2.88	1.91	3.82
Madison Airport	3.45	2.92	3.70	2.06	3.04	2.74	1.90
Stoughton	4.08	3.71	3.91	2.39	3.82	4.47	3.46
Beloit	4.74	4.30	3.55	--	2.40	3.03	2.69
Normal	3.09	3.20	3.78	3.80	3.99	3.98	2.46

Rock County, 2001 Corn after corn; Plano silt loam=3.5% OM

Reps	Fall N (82-0-0)	Spring Preplant N (28% UAN)	Total N (lbs/acre)	Average Yield (bu/acre)	Marginal* Return ($/acre)
3	0	160	160	138.2	214.71
3	100	60	160	142.4	219.20
3	0	190	190	144.6	218.59
3	190	0	190	135.4	209.51
3	100	90	190	139.5	205.44

* Corn price = $1.90; N = $.18/lb (82-0-0), $.28/lb (28% UAN);
Fall N application = $5.50/acre; Preplant N application = $3/acre

Rock County, 2002 Corn after corn; Plano silt loam=3.5% OM

Reps	Fall N (82-0-0)	Spring Preplant N (28% UAN)	Total N (lbs/acre)	Average Yield (bu/acre)	Marginal* Return ($/acre)
3	0	160	160	151.7	304.73
3	100	60	160	159.7	315.23
3	0	190	190	150.6	295.95
3	190	0	190	158.8	314.40
3	100	90	190	162.5	315.23

* Corn price = $2.25; N = $.16/lb (82-0-0), $.21/lb (28% UAN);
Fall N application = $5.50/acre; Preplant N application = $3/acre

Stoughton, 2002 Corn after corn; Plano silt loam = 2.9% OM

Reps	Fall N (82-0-0)	Spring PrepInt N (82-0-0)	Sidedress N (28% UAN)	Total N* (lbs/acre)	Average Yield (bu/acre)	Marginal** Return ($/acre)
2	0	170	0	175	194.8	411.75
2	0	170	40	215	194.1	399.78
2	180	0	0	185	182.8	376.10
2	180	0	40	225	186.3	373.58

* 5 lbs N credited from starter

** Corn price = $2.25; N = $.15/lb (82-0-0), $.21/lb (28% UAN);
Sidedress N application at cultivation = $2/acre

De Forest, 2002 Corn after corn; Plano silt loam = 2.5% OM

Reps	Fall N (82-0-0)	Planter N (27-0-0-1.75)	Total N (lbs/acre)	Average Yield (bu/acre)	Marginal* Return ($/acre)
2	100	40	140	160.1	325.23
2	0	140	140	143.5	292.88
2	100	60	160	154.5	308.63
2	0	160	160	146.9	296.53

* Corn price = $2.25; N = $.15/lb (82-0-0), $.20/lb (28% UAN); N-Serve = $7/ac;
Fall N application = $4/acre; N application at planting = $1low rate -$2 high rate/acre

Summary

- 1999-2001 Average yields in 4/5 cases showed no significant differences between application times (fall vs. spring or in-season split);
- Significant yield increase (20 bu/ac) from sidedress at Arlington in 2000, a year of high rainfall in early growing season;
- Average yields (5/5 cases) were never significantly increased by N rates above the 160/120 lb soil test recommendation;
- Economics always favored rates at or below the 160/120 lb soil test UWEX recommendation.

Summary

- 2002 Application time results variable – very dry soil conditions in south-central WI;
- 2002 Yields in 2/3 cases were favored by fall applications of anhydrous ammonia compared to spring-applied 28% UAN;
- Yields were not improved by sidedress N applications (2 farms);
- Yields and economics were not improved when N rates exceeded 160 lb/acre recommendation.