Evaluating Optimum Side-Dress N Application Rates for Corn Following Soybeans

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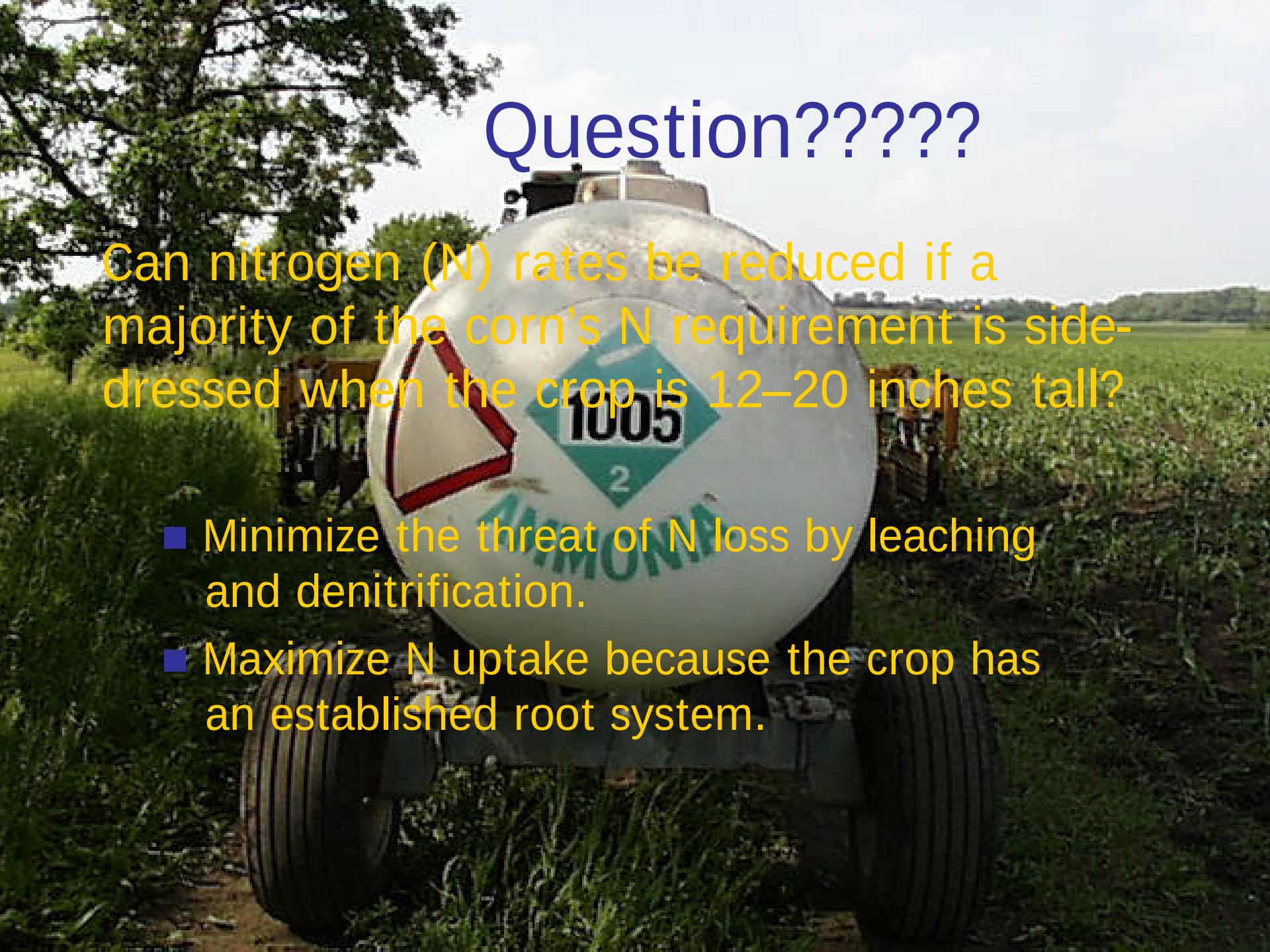


Question?????

Can nitrogen (N) rates be reduced if a majority of the corn's N requirement is side-dressed when the crop is 12–20 inches tall?

- Minimize the threat of N loss by leaching and denitrification.
- Maximize N uptake because the crop has an established root system.

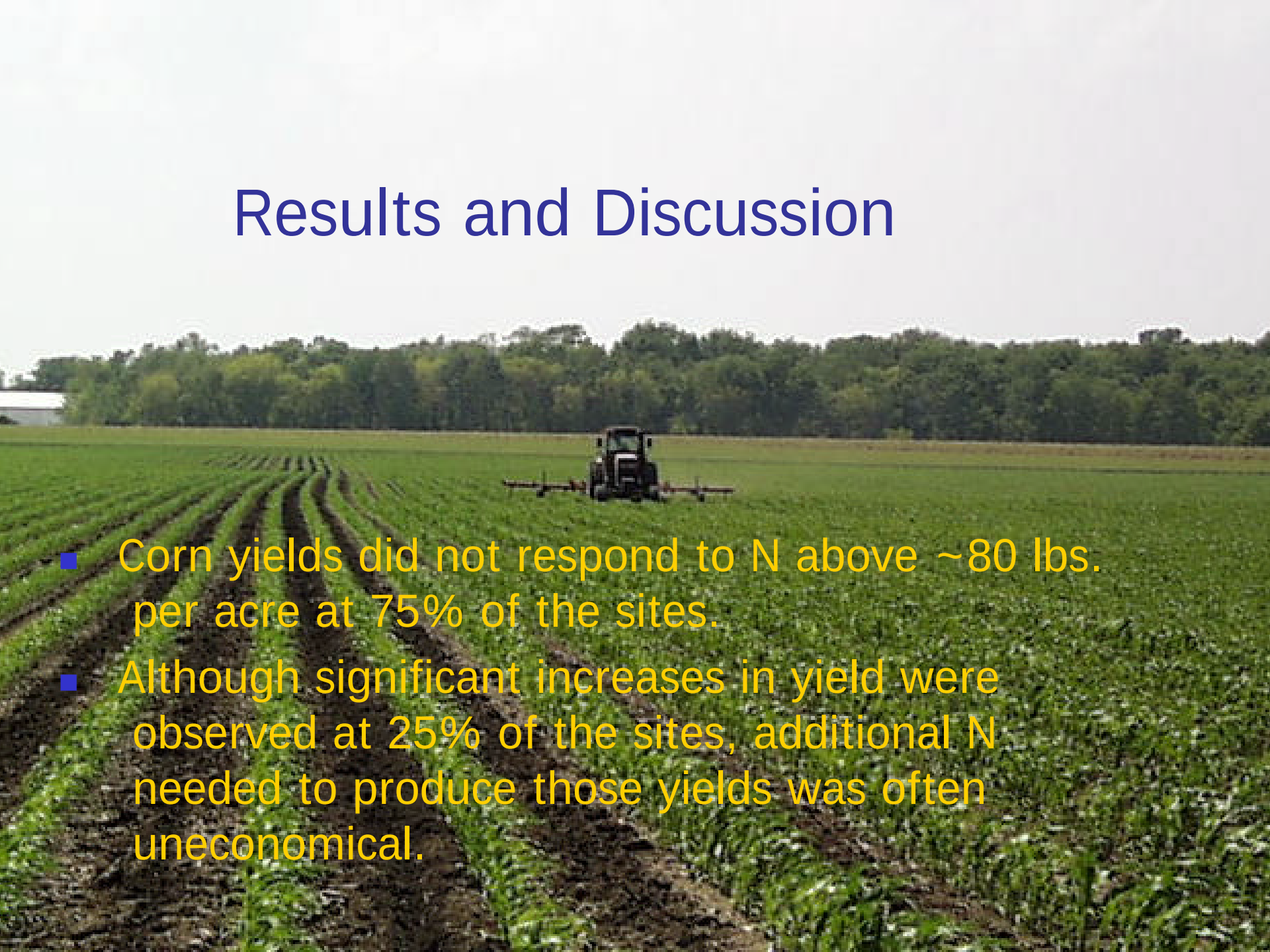
Materials and Methods

- 3-year study with 13 locations.
- Fields were planted to corn following soybeans.
- Four N rates were evaluated (80, 120, 160, 200 lbs. actual N per acre).
- N was side-dressed when corn was 12-20 inches tall.
- N was applied as anhydrous or 28%.

Materials and Methods (cont.)

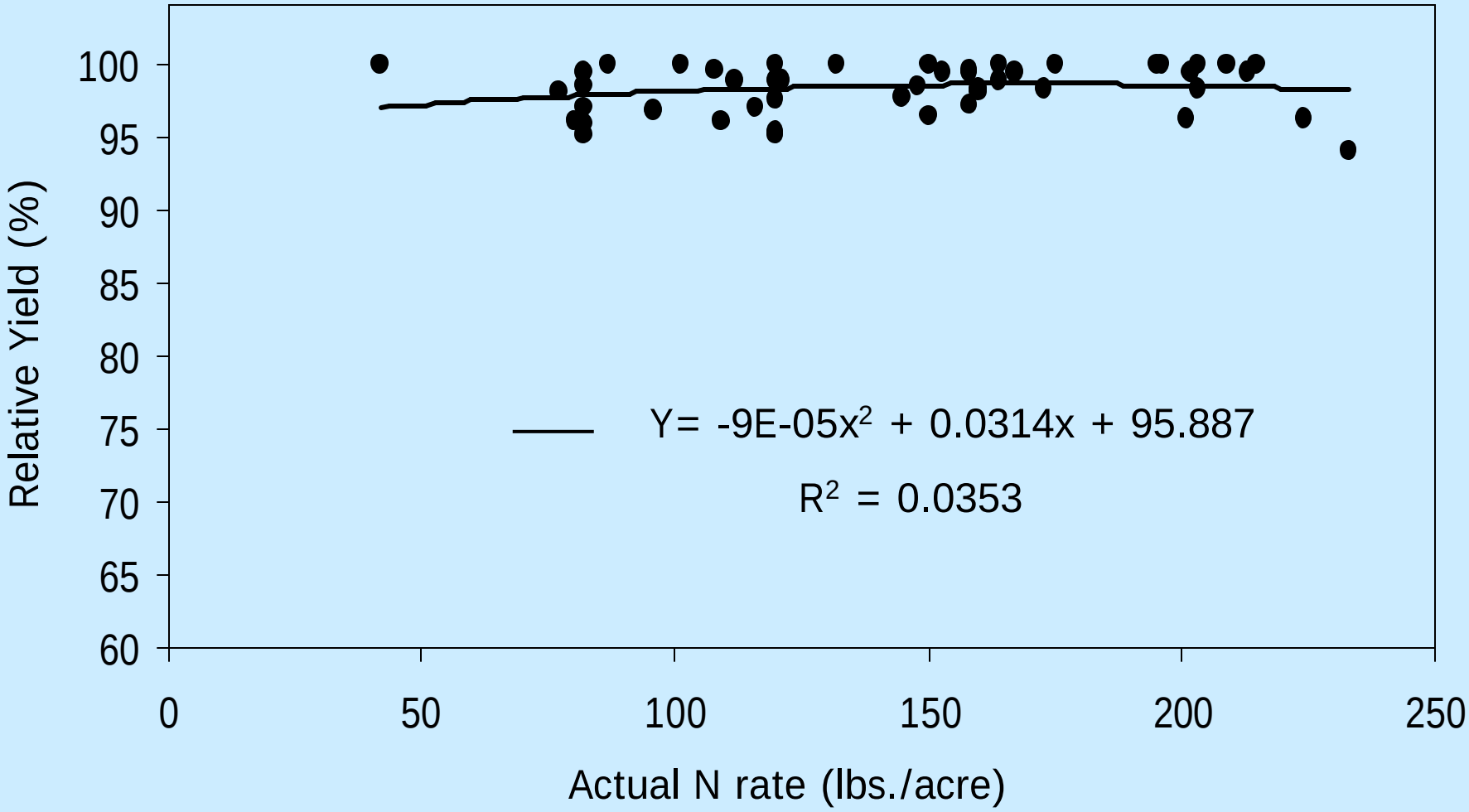
- Each treatment was replicated 3 times.
- Each plot averaged 0.41 acres.
- Soil series ranged from:
  - Pella silt loam and Milford silty clay loam soils between 5-6% O.M.
  - Kidder silt loam 2% O.M.

Results and Discussion



- Corn yields did not respond to N above ~80 lbs. per acre at 75% of the sites.
- Although significant increases in yield were observed at 25% of the sites, additional N needed to produce those yields was often uneconomical.

Results and Discussion (cont.)



Results and Discussion (cont.)

Corn following soybean

Year	Site	N rate (lbs./acre)	Yield (bu)
2000	Novak	82	157 b
		150	159 ab
		175	165 a
		213	164 ab

An additional 93 units of N are needed to gain 8 bushel of corn.

Results and Discussion (cont.)

Anhydrous N = 93 units x $0.15 = $13.95
28% N = 93 units x $0.24 = $22.32

8 bushel extra yield at $2.00/bu. = $16

Gain of $2.05 per acre using anhydrous N

Loss of $6.32 per acre using 28% N

Results and Discussion (cont.)

Corn following corn (one site/year only)

Year	Site	N rate (lbs./acre)	Yield (bu)
2001	Novak	81	145
		111	147
		156	145
		192	147

Significant yield differences were not observed above ~80 lbs. side-dressed N

Results and Discussion (cont.)

Year	April	May	June	July	Aug	Sept.	Oct.
	----------Rainfall (in.)----------						
1999	6.2	4.5	5.2	4.4	1.9	3.3	0.7
2000	2.9	7.9	3.1	3.8	2.7	6.3	0.6
2001	2.8	6.3	3.5	1.5	3.4	7.4	3.9

Conclusions

- It appears that in most years, if N is side-dressed, application rates for corn after soybeans could be safely reduced from 120 to 80 lbs. per acre with little or no impact on yield.
- Side-dressing N and reducing application rates would save producers a minimum of $6 to $10 per acre in N fertilizer expenses alone.

Conclusions (cont.)

- N Losses appear minimal when side-dressed to 12-20 inch tall corn compared to fall or preplant applications.
- Side-dressing N when the crop can most efficiently use it can improve profitability and should reduce the potential of N contaminating groundwater.