

Wheat Topdress Fertilizer Study – Lee Scheufler



January 19, 2005

Kansas Agricultural Research Association

2005 Precision Ag Conference

Hays, Kansas

Wheat Topdress Fertilizer Study



Lee A. Scheufler

Scheufler Farms, Inc.

1810 22nd Road

Sterling, KS 67579

620-257-2508

Lee@ScheuflerFarms.com



Background:

Are we using enough Nitrogen when topdressing our dryland wheat?

We have been using a simple equation to determine the amount to apply based on yield goal, previous crop, carry-over nitrogen, starter fertilizer, and other topdress applications.



Background:

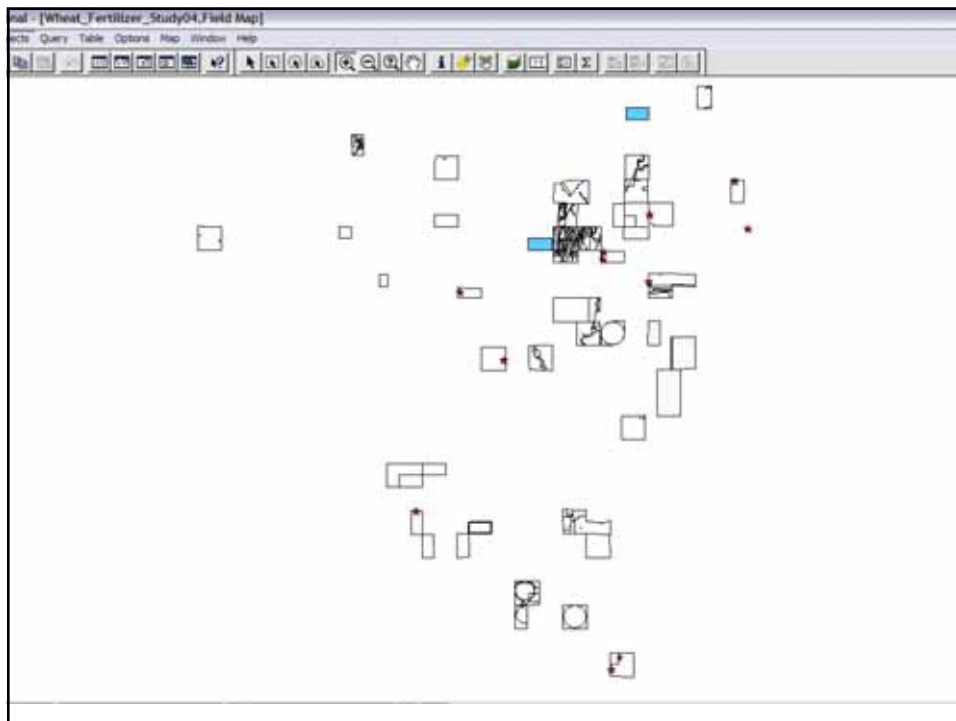
Yield goal *		(credit for soybeans)
1.8	minus	(carryover)
		(starter fertilizer)
		(other applications)

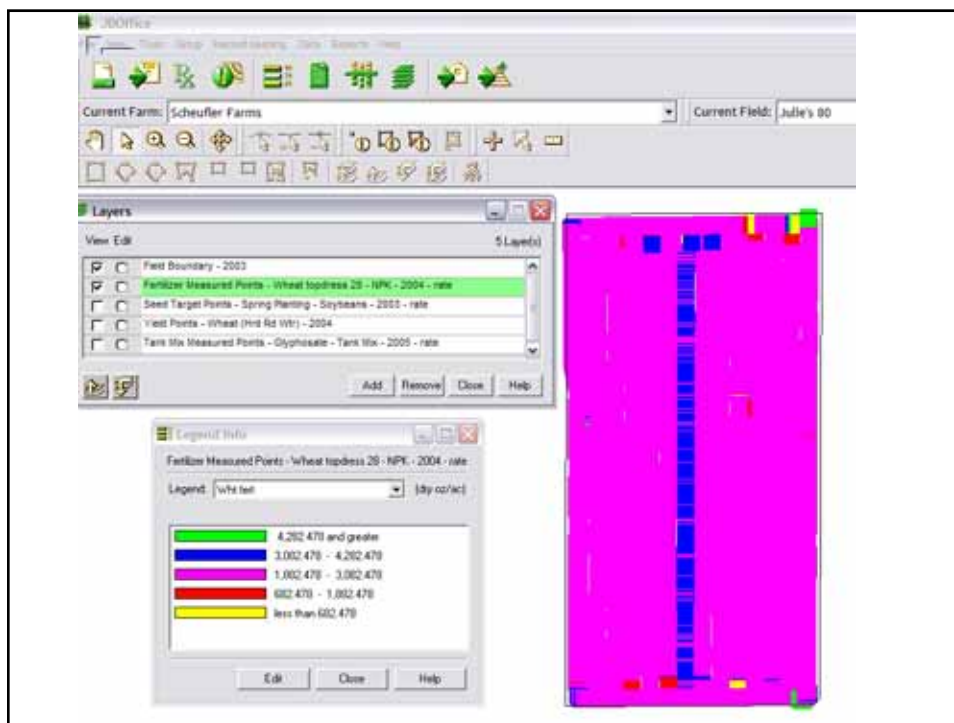
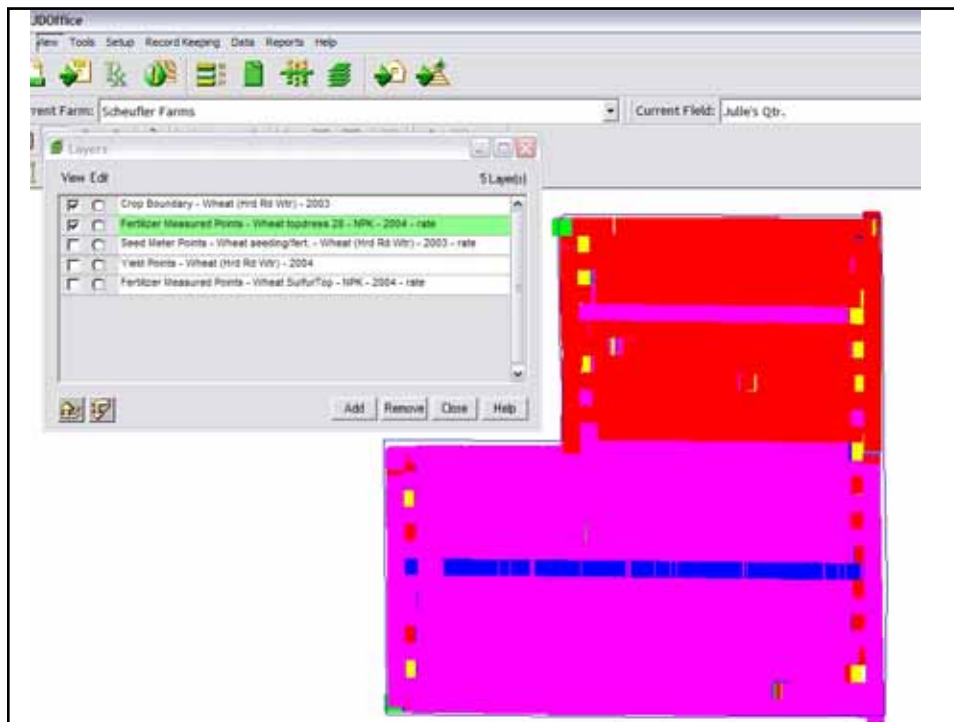
= Topdress amount



Methodology

At topdress time (early spring '04) we applied an additional 20 units of nitrogen to one pass of the fertilizer sprayer (90 feet) on 10 fields. The location of these were recorded in JD Office using the Field Doc program in a JD4710 sprayer.

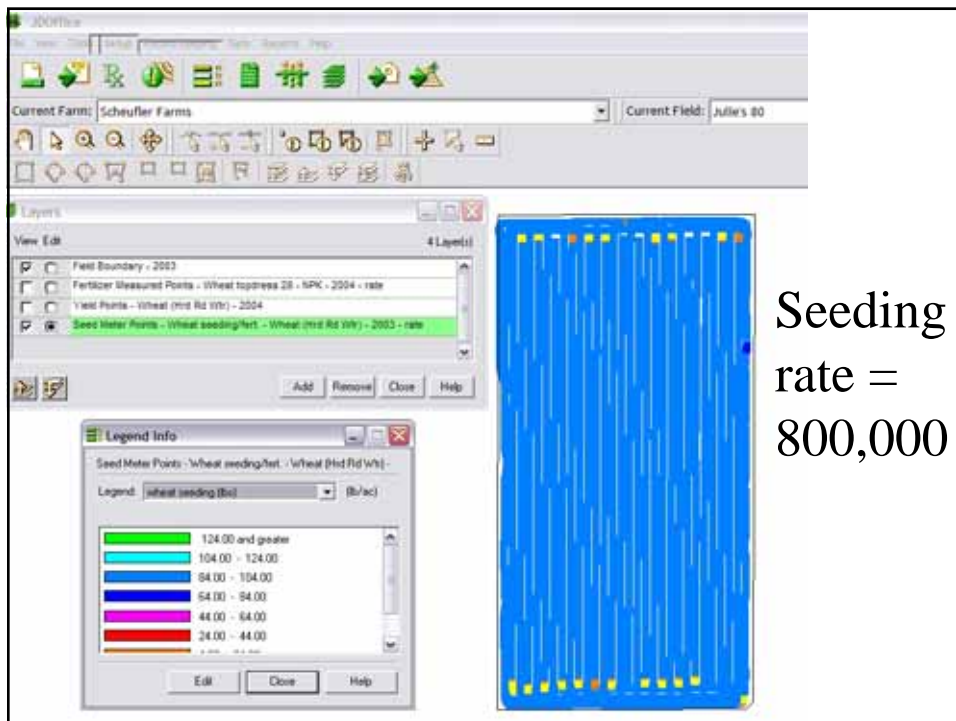


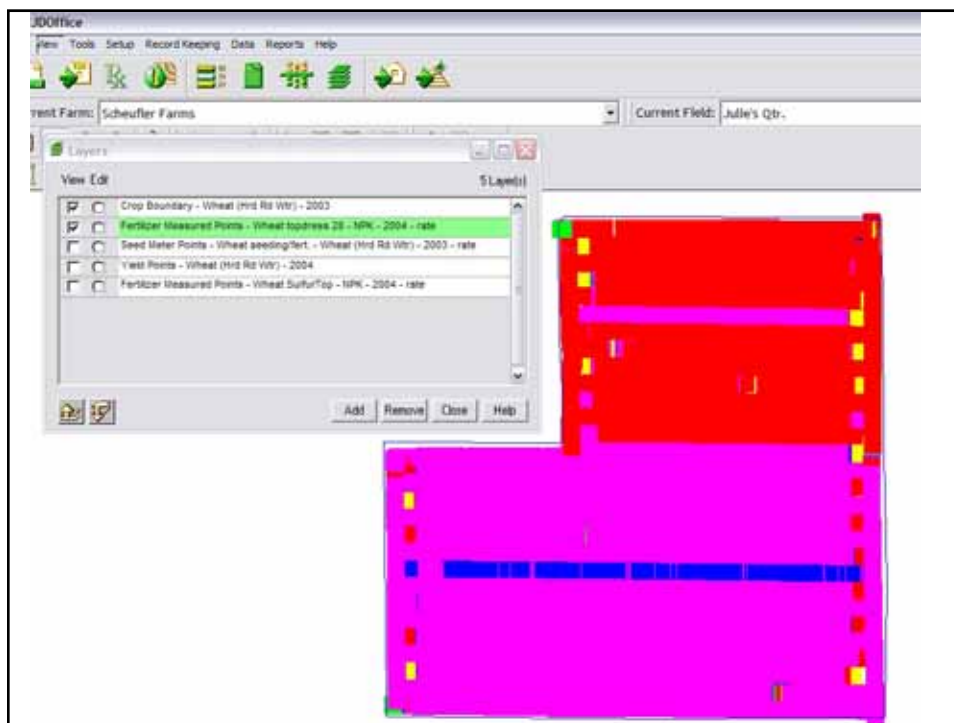
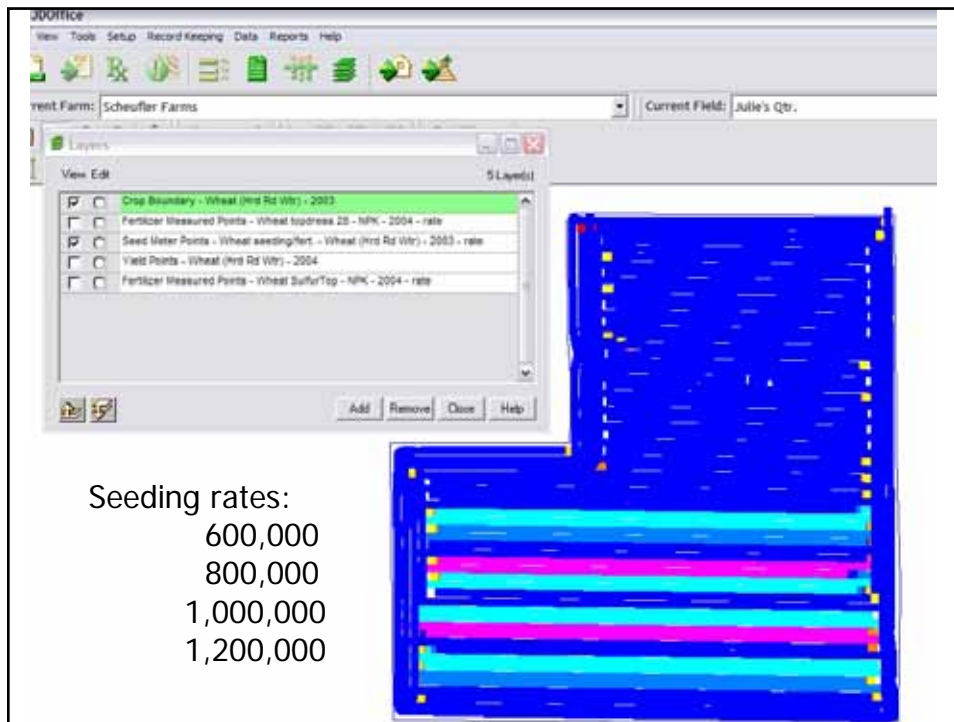


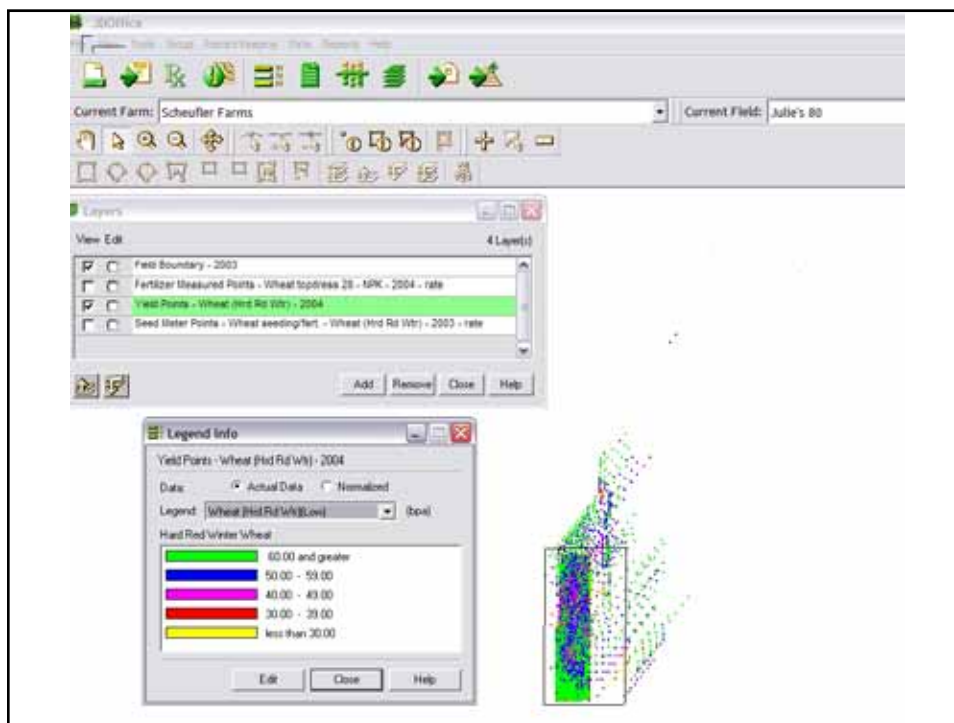
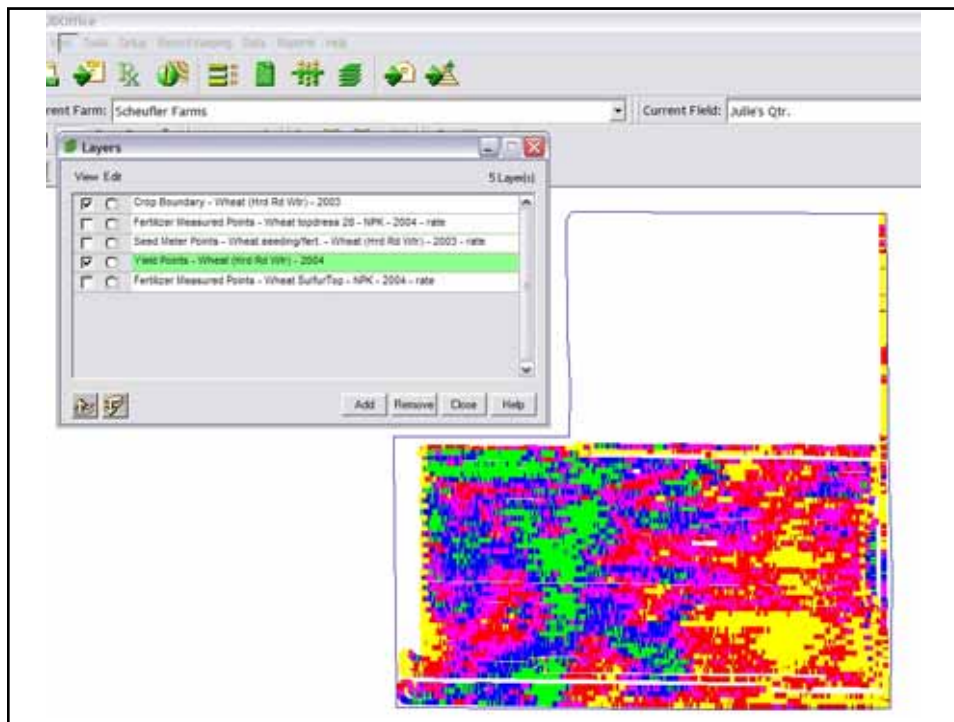


Methodology

All other cultural practices are to remain the same.









Problems with data:

Mixture of variables (fert rate/
seeding rate.

Yield distortions due to GPS errors.

Not harvesting with yield monitor
combine.



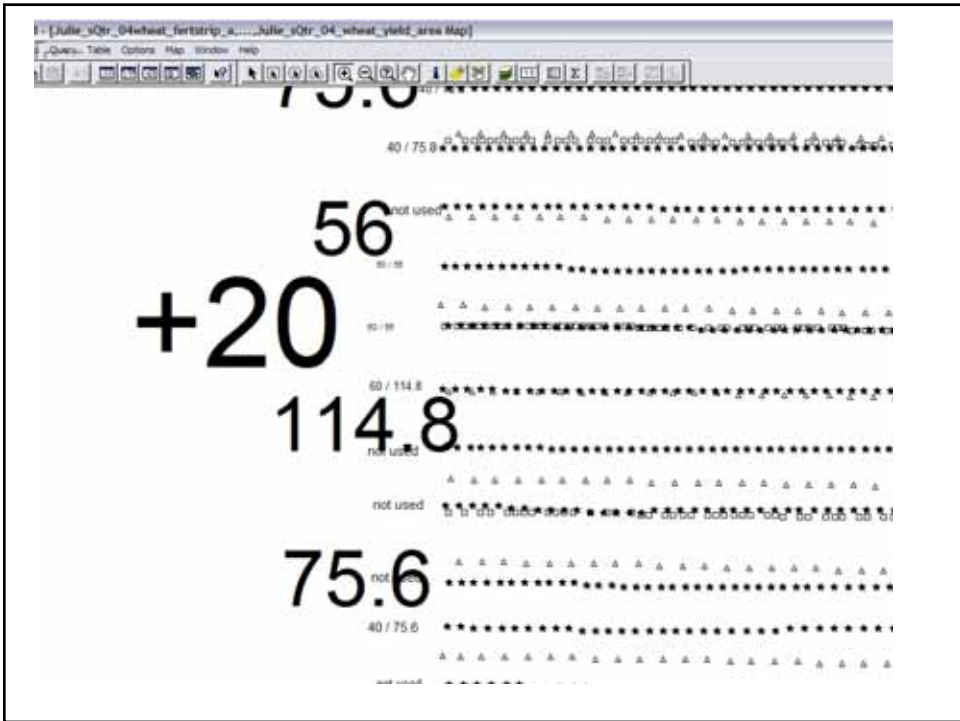
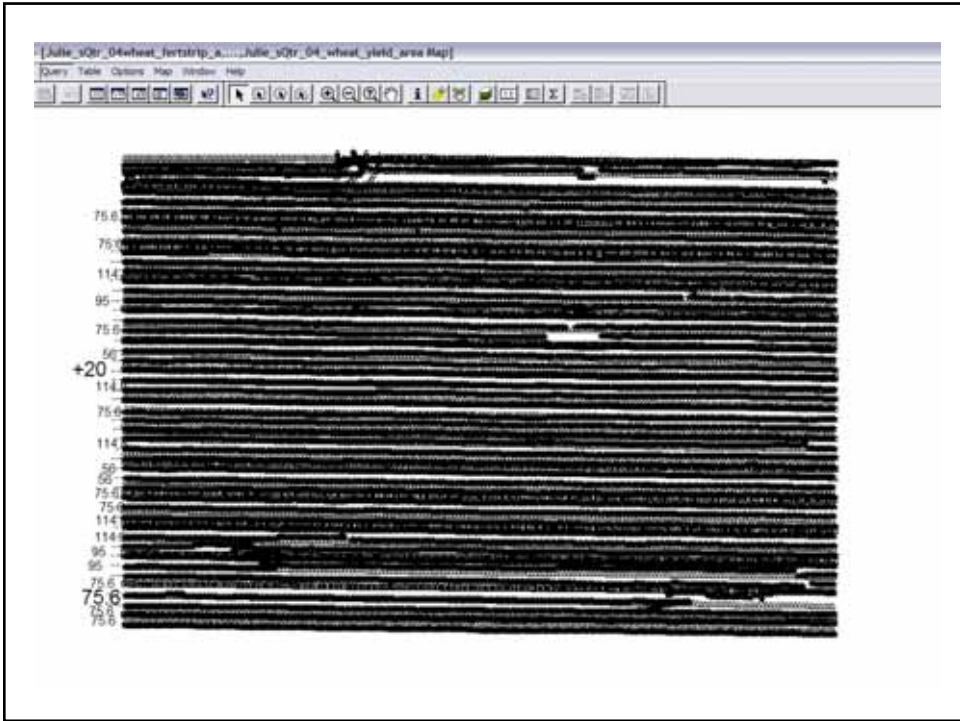
Solutions:

Take to Map Info & see what can be
done.

Table structure & query capabilities of a
data base.

Use combination of SQL and Spatial
selection.

Analyze as series of strip trials.



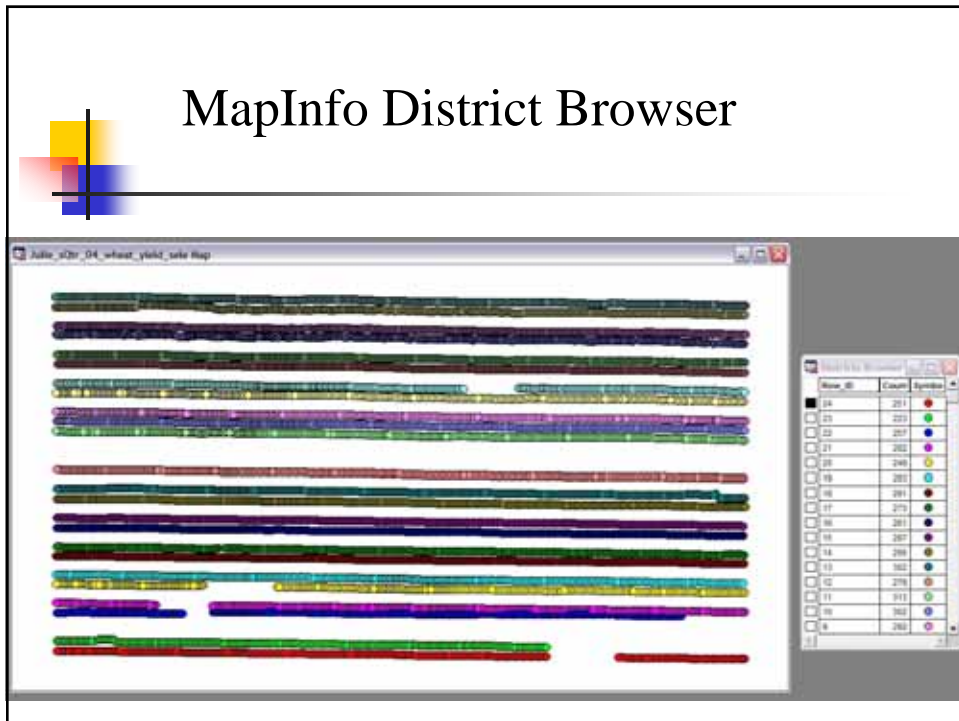
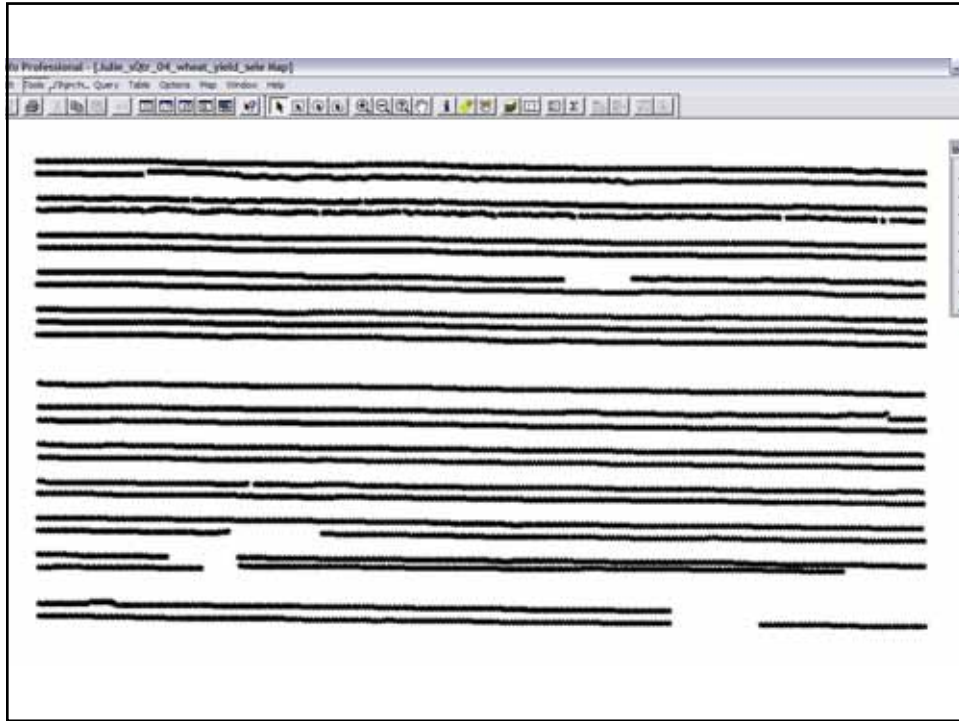


Table view of Data:

Fert Rate
Seed rate
Row ID

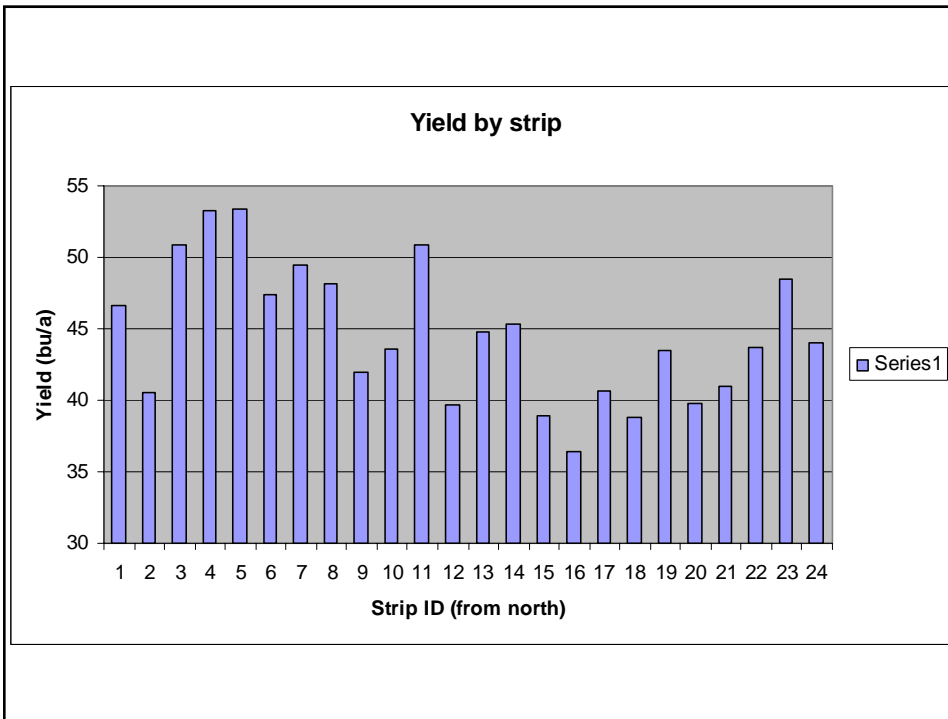
Over 7,000 data points

Opened in Excel:

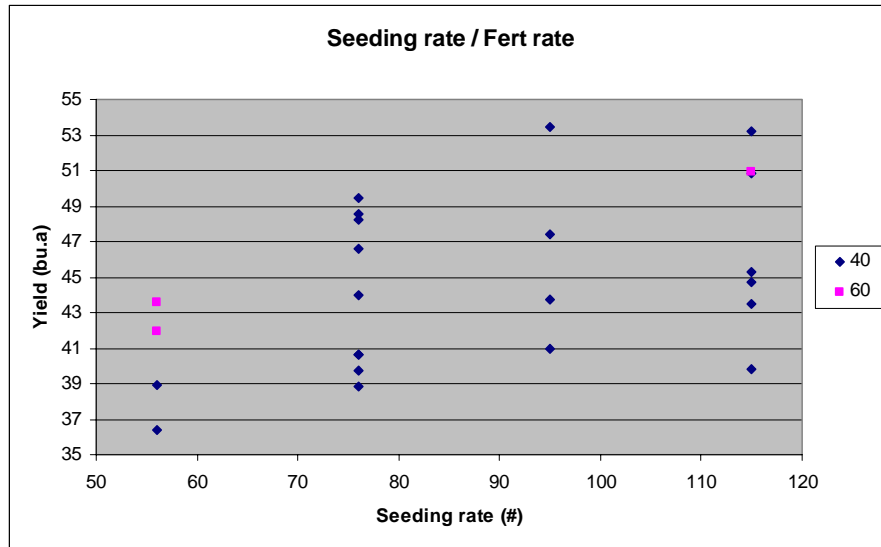
Still 7,000 + records

Lotus 123 spreadsheet of yield by strip vs. fert rate/ seeding rate
(Developed after using "crosstab" feature)

	40	40	40	40	40	60	60	60	Total	Total
	56	76	95	115	Total	56	115	Total	56	56
1		46.6			46.6					46.6
2		40.6			40.6					40.6
3				50.9	50.9					50.9
4				53.2	53.2					53.2
5			53.4		53.4					53.4
6			47.4		47.4					47.4
7		49.4			49.4					49.4
8		48.2			48.2					48.2
9						42.0		42.0		42.0
10						43.6		43.6		43.6
11							50.9	50.9		50.9
12		39.7			39.7					39.7
13				44.7	44.7					44.7
14				45.3	45.3					45.3
15	38.9				38.9					38.9
16	36.4				36.4					36.4
17		40.6			40.6					40.6
18		38.9			38.9					38.9
19				43.5	43.5					43.5
20				39.8	39.8					39.8
21			40.9		40.9					40.9
22			43.7		43.7					43.7
23		48.5			48.5					48.5
24		44.0			44.0					44.0
Total	37.7	43.9	46.5	46.3	44.5	42.8	50.9	45.5		44.6



Julie's quarter data



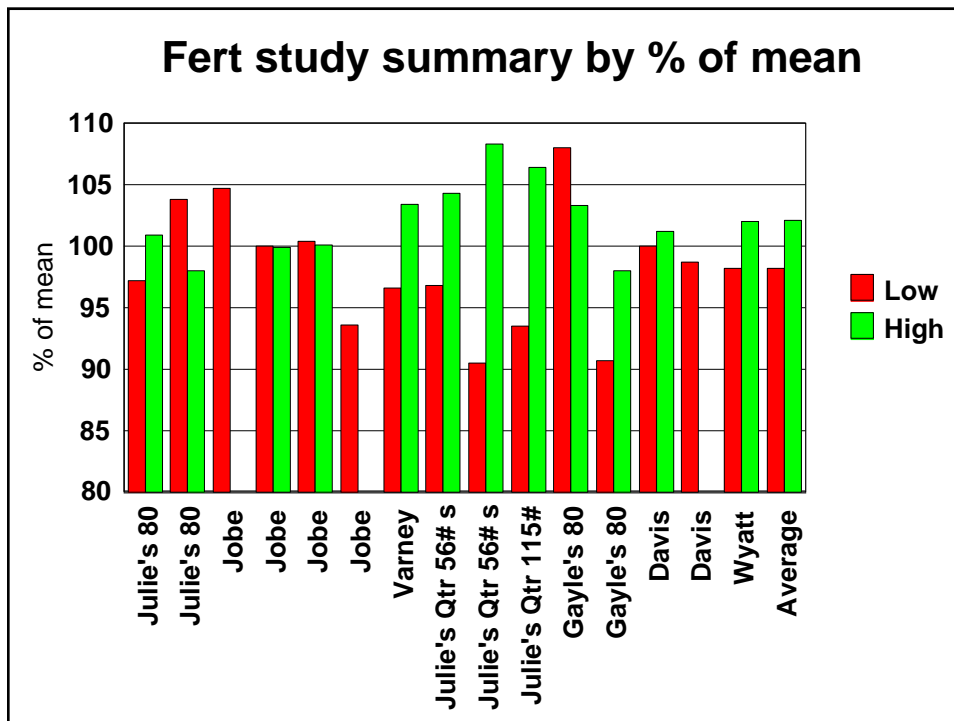
Wheat Fert Study – Lee Scheufler



By carefully (tediously) going through the data, we were able to capture data from 7 fields with 27 strips

To better analyze the data across fields/ treatments, a mean for each field treatment was calculated. The data for each trial is expressed as a percentage of the mean for that field study area. Further, the difference is calculated between high fert and low fert for each pair.

	Low	High	H - L
Julie's 80	97.3	100.9	3.7
Julie's 80	103.9	98.0	-5.9
Jobe	104.7		
Jobe	100.0	99.9	-0.1
Jobe	100.5	100.1	-0.3
Jobe	93.6		
Varney	96.6	103.4	6.9
Julie's Qtr 56#	96.8	104.3	7.5
Julie's Qtr 56#	90.5	108.4	17.9
Julie's Qtr 115	93.5	106.5	12.9
Gayle's 80	108.0	103.3	-4.7
Gayle's 80	90.6	98.0	7.4
Davis	100.1	101.2	1.1
Davis	98.7		2.5
Wyatt	98.2	102.0	3.8
Average	98.2	102.2	4.0



Average % response to fertilizer	3 . 9 8	
Average yield for farm	5 0	
Calculated yield response (bu./A)	1 . 9 9	

Wheat Fert Study – Lee Scheufler



Another important factor in the decision is the financial part of the response.

To look at the \$\$ side of it, I have constructed the following matrix:

Nitrogen price vs. Wheat price Matrix

		Price/Ton UAN	\$100	\$125	\$150	\$175	\$200	\$225	\$250
		Price/#N	0.1563	0.1953	0.2344	0.2734	0.3125	0.3516	0.3906
Wheat \$/bu	Per Acre		\$3.13	\$3.91	\$4.69	\$5.47	\$6.25	\$7.03	\$7.81
\$2.50	\$4.97	\$1.85	\$1.07	\$0.29	(\$0.50)	(\$1.28)	(\$2.06)	(\$2.84)	
\$2.75	\$5.47	\$2.35	\$1.56	\$0.78	\$0.00	(\$0.78)	(\$1.56)	(\$2.34)	
\$3.00	\$5.97	\$2.84	\$2.06	\$1.28	\$0.50	(\$0.28)	(\$1.06)	(\$1.84)	
\$3.25	\$6.47	\$3.34	\$2.56	\$1.78	\$1.00	\$0.22	(\$0.57)	(\$1.35)	
\$3.50	\$6.96	\$3.84	\$3.06	\$2.28	\$1.49	\$0.71	(\$0.07)	(\$0.85)	
\$3.75	\$7.46	\$4.33	\$3.55	\$2.77	\$1.99	\$1.21	\$0.43	(\$0.35)	
\$4.00	\$7.96	\$4.83	\$4.05	\$3.27	\$2.49	\$1.71	\$0.93	\$0.14	
\$4.25	\$8.45	\$5.33	\$4.55	\$3.77	\$2.99	\$2.20	\$1.42	\$0.64	
\$4.50	\$8.95	\$5.83	\$5.05	\$4.26	\$3.48	\$2.70	\$1.92	\$1.14	
\$4.75	\$9.45	\$6.32	\$5.54	\$4.76	\$3.98	\$3.20	\$2.42	\$1.64	

Wheat Fert Study – Lee Scheufler



Conclusions:

Even though the data looked pretty rough, we were able to salvage quite a bit for analysis.



Conclusions:

There was variability of the response (negative 5.9% through positive 17.9%). The average response to 20#/A additional N was about 4% or 2 bu/a



Conclusions:

Assuming the response will be consistent across years, the financial analysis still shows that with current price relationships between Nitrogen (UAN about \$225/Ton) and wheat (July '05 about \$3.00), there would be a negative return to adding 20# of N to our current fertility calculation algorithm (-\$1.06 per acre).

Wheat Topdress Fertilizer Study



Questions and Discussion

What should we do now? There was more yield than our simple model for fertilizing would predict. Should we be trying lower fertilizer rates?

Wheat Topdress Fertilizer Study



Questions and Discussion

Lee A. Scheufler
Scheufler Farms, Inc.
1810 22nd Road
Sterling, KS 67579
620-257-2508
Lee@ScheuflerFarms.com