

# Carrington Research Extension Center Manure Research



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# Crop Yield and Soil Chemical Property Trends from Long-Term Manure Use

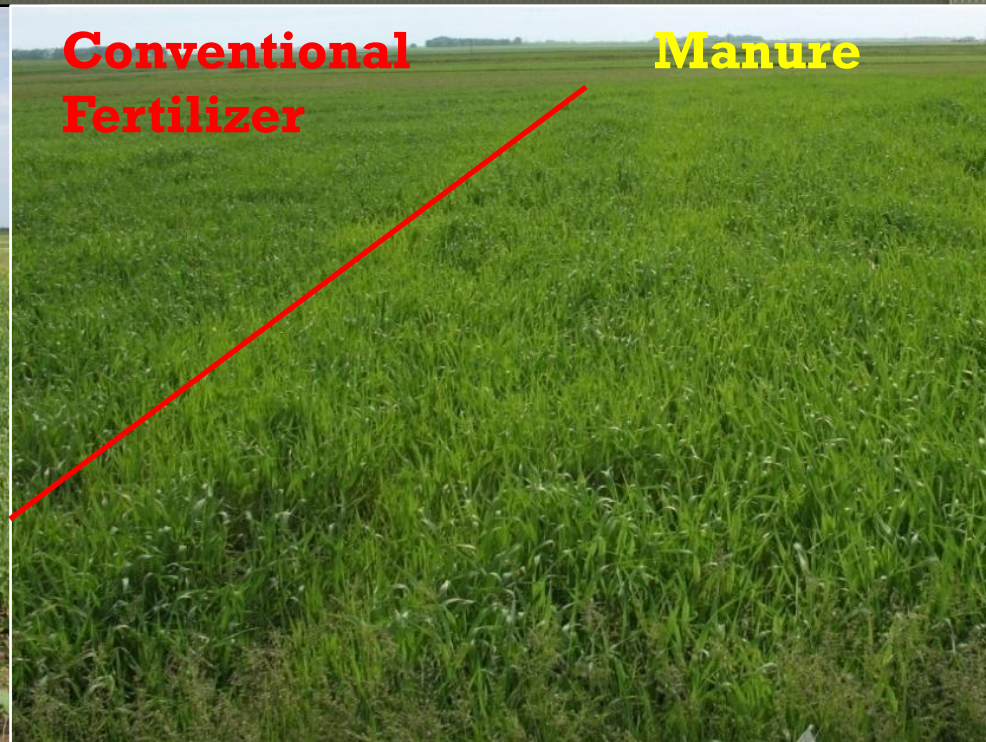
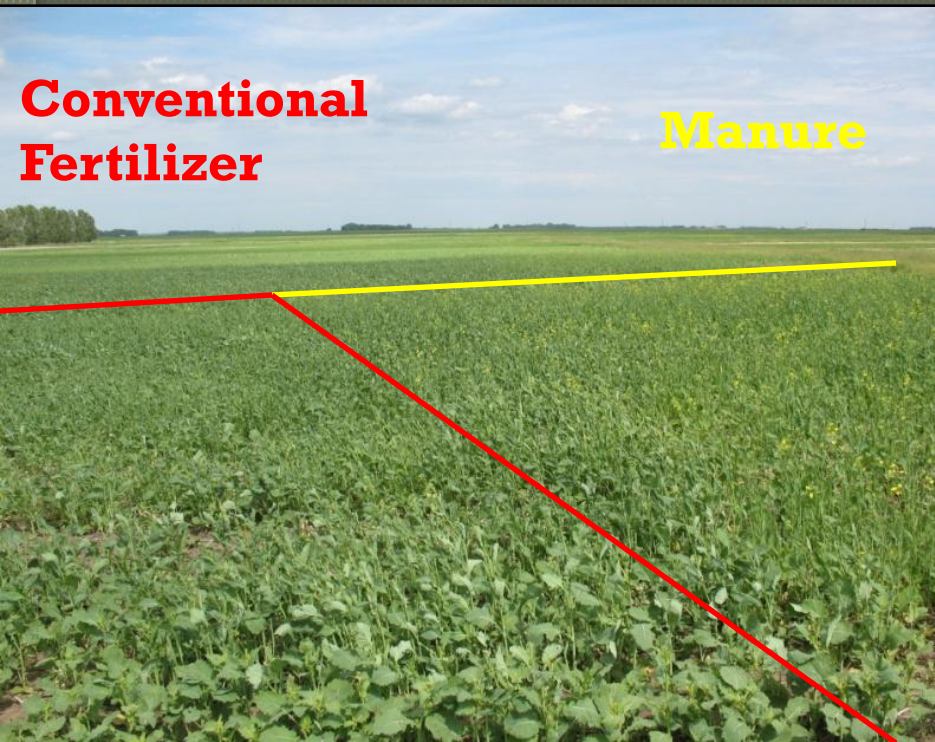
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- Cropping Systems study since 1987
- Fertility Treatments
  - 40 & 80lbs commercial N
  - 40lbs manure N
- Tillage Treatments
  - No-till, Min-till, & Con-till





# Crop Yield and Soil Chemical Property Trends from Long-Term Manure Use



# 2008 Cropping Systems Map

**Rotation 1 =**  
Wheat/Sunflower/Barley/Soybean

**Rotation 2 =**  
Wheat/Soybean/Corn/Field Pea

**Rotation 3 =**  
Wheat/Corn/Soybean/Canola

**Rotation 3 =**  
WheatCC/Corn/Soybean/CanolaCC

0 = 0 lbs. N as Urea

50 = 50 lbs. N as Urea

Man = 50 lbs. N as Manure

100 = 100 lbs. N as Urea

**N**

T = Conventional Tillage

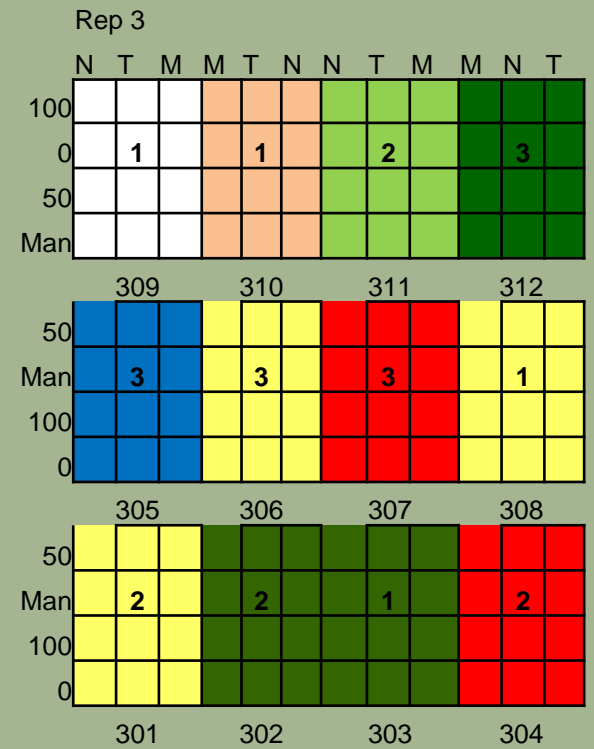
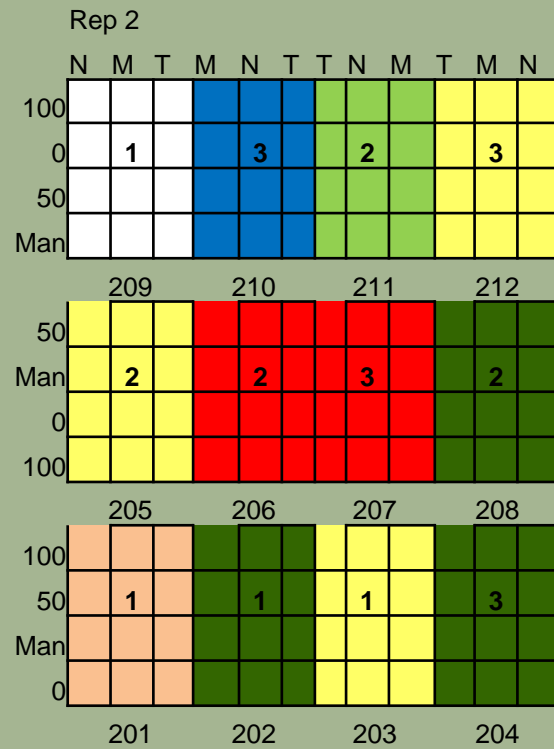
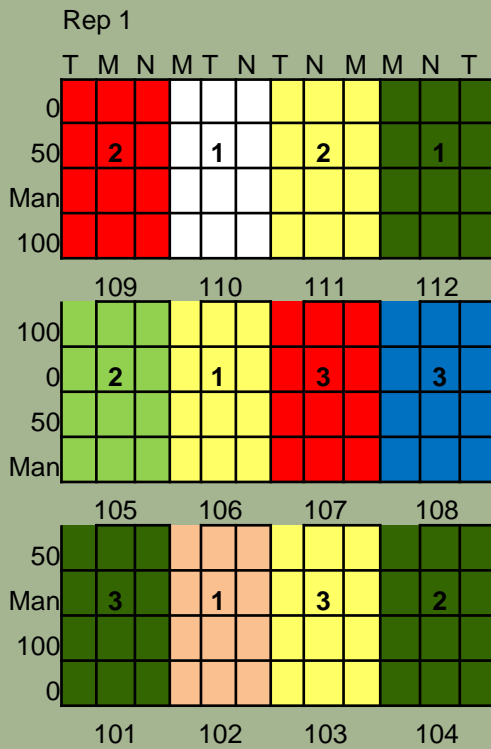
M = Minimum Tillage

N = No Tillage

Barley    Field Peas    Sunflower

Canola    Soybean    Wheat

Corn



# Crop Yield and Soil Chemical Property Trends from Long-Term Manure Use

*Table 1. Selected comparisons of crop yield and soil properties from the Carrington Research Extension Center long term cropping systems trial.*

<u>Crop Yield</u>	<u>1999-2002</u>	<u>2003-2006</u>
Barley	manure < 80 lbs N	manure = 80lbs N
Corn	manure = 80lbs N	manure = 80lbs N
Sunflower	manure = 80lbs N	manure = 80lbs N
Wheat	manure > 80 lbs N	manure > 80 lbs N
<u>Soil Property</u>		
ppm Nitrate	manure << 80 lbs N	manure << 80 lbs N
% Organic Matter	manure >> 80 lbs N	manure >> 80 lbs N
pH	manure > 80 lbs N	manure > 80 lbs N



# Wheat Response to Fall vs. Spring Manure Application

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- Objective: Determine if spring or fall manure application is better.
- Applied 114lbs of N/acre for 60bu/acre of wheat.



# Wheat Response to Fall vs. Spring Manure Application

- Yield: Spring Urea > Fall Manure > Spring Manure ≥ Check
- Protein: Spring Urea > Fall Manure > Spring Manure > Check

Table 1. Response of Hard Red Spring Wheat to Fall and Spring Applied Manure

<u>Treatment</u>	<u>Height</u> (cm)	<u>Spike Count</u> (spikes/m)	<u>NDVI</u> (% VI) <sup>1</sup>	<u>Yield</u> (bu/acre)	<u>Test Weight</u> (lb/bu)	<u>Protein</u> (%)
Check	71 b	9.5	0.34 b	26 c	63	13.1 b
Spring Urea	82 a	12.3	0.53 a	51 a	62	15.2 a
Fall Manure	75 b	11.6	0.50 a	39 b	63	13.4 b
Spring Manure	73 b	11.9	0.47 a	34 bc	63	13.3 b

<sup>1</sup>VI=vegetative index, the darkness and volume of green per plant

LSD=0.05



# Wheat Response to Fall vs. Spring Manure Application

- Conclusions:
- This is the first study I came across where conventional fertilizer outperformed manure fertilizer.
- Weather was cold and dry.
- Soil microbes need moist and warm weather to mineralize organic-N.
- This study indicates Fall Manure is better than Spring Manure.





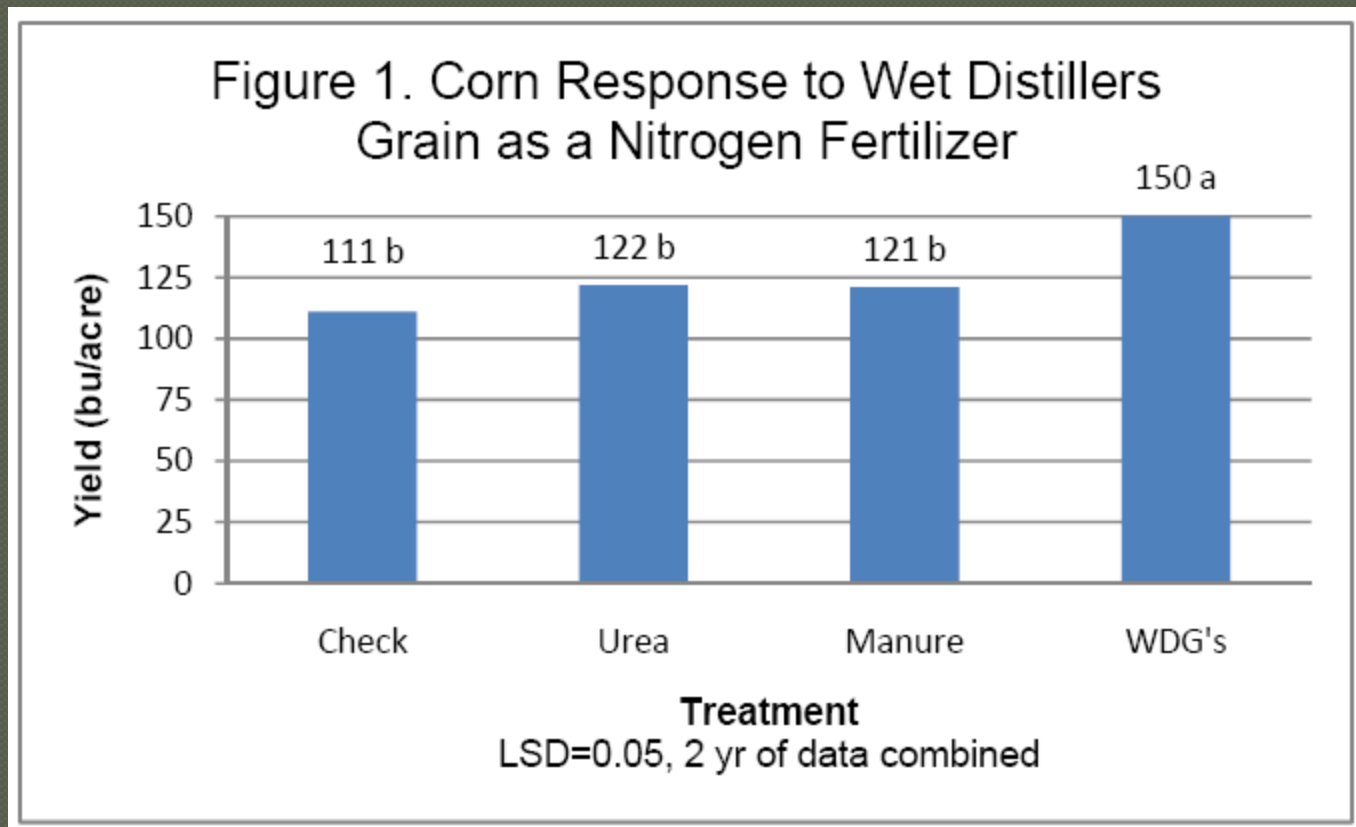
# Corn Response to Wet Distillers Grain as a Nitrogen Fertilizer

- Objective: Test N nutrient availability of WDG's
- Applied N for 150bu/ac yield.
- Assumed 60% of Total N from WDG will be utilized by corn.



# Corn Response to Wet Distillers Grain as a Nitrogen Fertilizer

- N uptake from WDG > 60%



# References

- Ron Wiederholt. 2008. Crop Yield and Soil Chemical Property Trends from Long-Term Manure Use. Carrington Research Extension Center
- Ron Wiederholt. 2008. Wheat Response to Fall vs. Spring Manure Application. Carrington Research Extension Center
- Ron Wiederholt. 2008. Corn Response to Wet Distillers Grain as a Nitrogen Fertilizer. Carrington Research Extension Center.





# Questions?

