



UNIVERSITY OF MINNESOTA EXTENSION  
Driven to Discover<sup>SM</sup>

# Sidedressing corn with swine manure

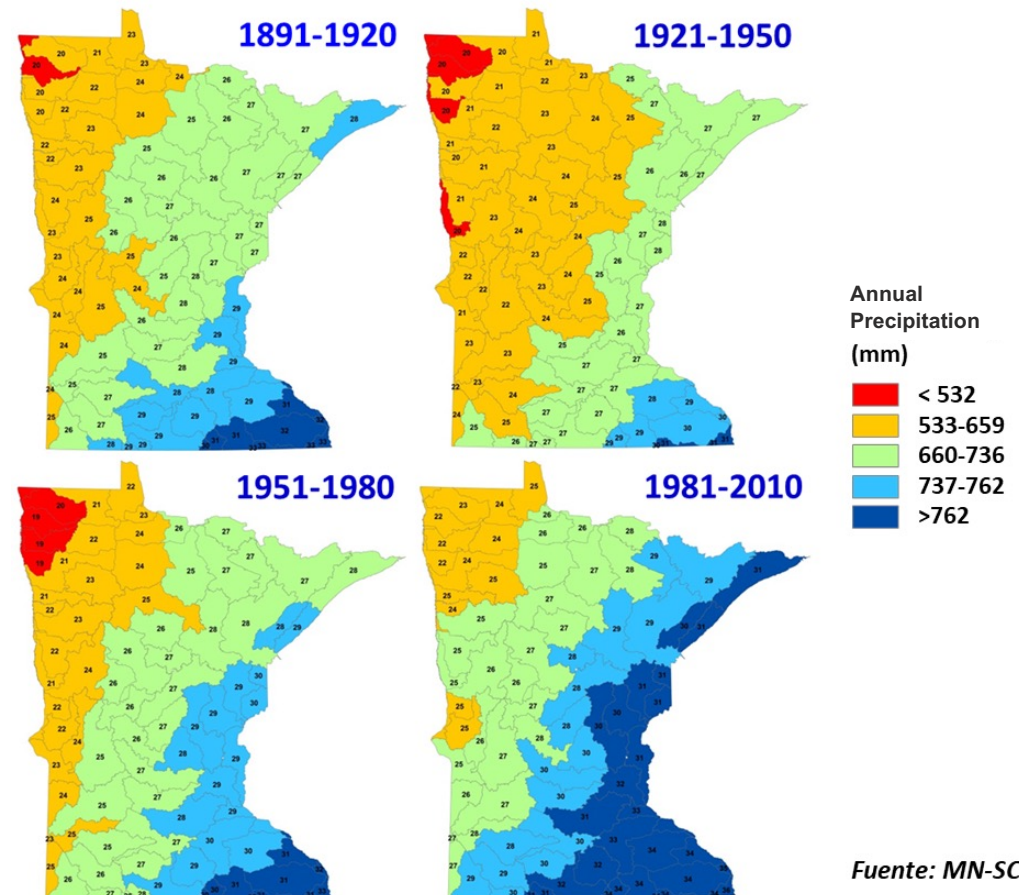
**Melissa Wilson, Ph.D.**

Associate Professor and Extension  
Specialist

**MAKING A DIFFERENCE IN MINNESOTA: ENVIRONMENT + FOOD & AGRICULTURE + COMMUNITIES + FAMILIES + YOUTH**

# The problem

- Annual precipitation, particularly in fall and spring, has been increasing
- Window of opportunity to apply manure has been decreasing



# Water, water everywhere

**Sep. 24, 2018 –  
Lamberton, MN**

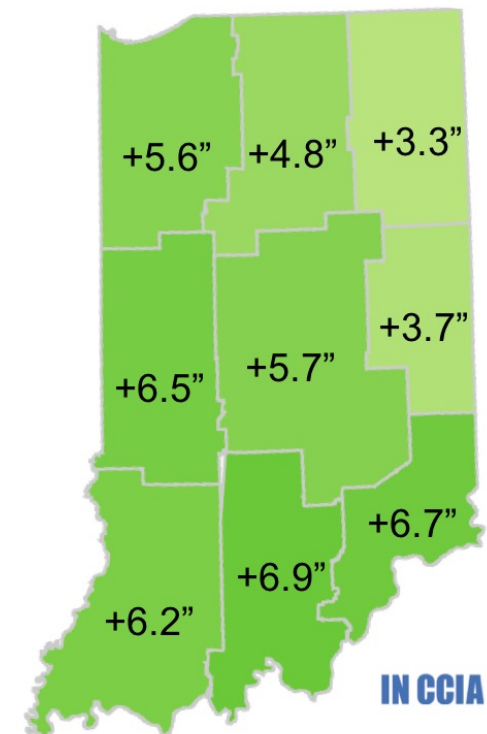


**May 20, 2019 –  
near Le Sueur, MN**



# Is it the same in Indiana?

Annual Average  
Precipitation on the Rise

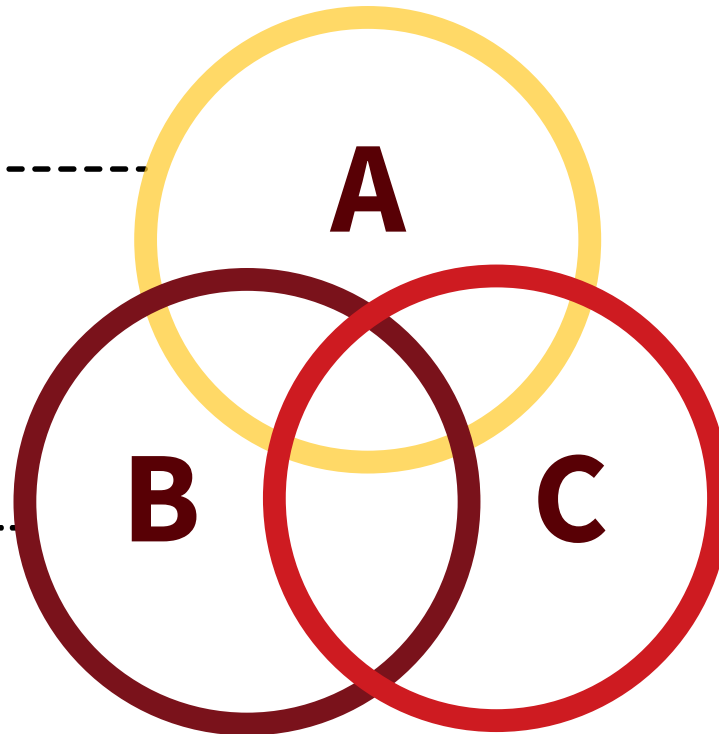


Change in annual average precipitation based  
on linear trend between 1895 to 2016

# Why sidedressing?

Fewer days  
for manure  
application

Older manure  
storages are  
filling up more  
quickly



Need for  
improved  
nutrient  
management

# What manure can be sidedressed?

Easily banded  
between rows



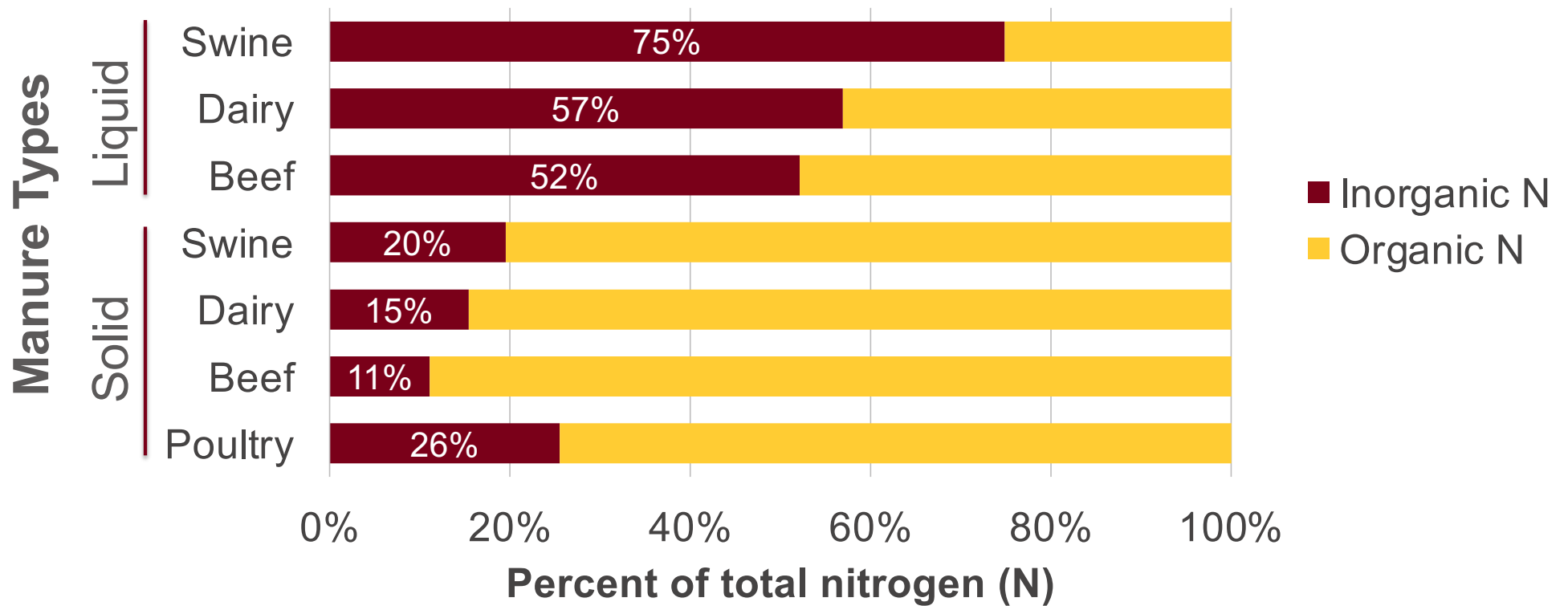
High amount of  
“available” nitrogen

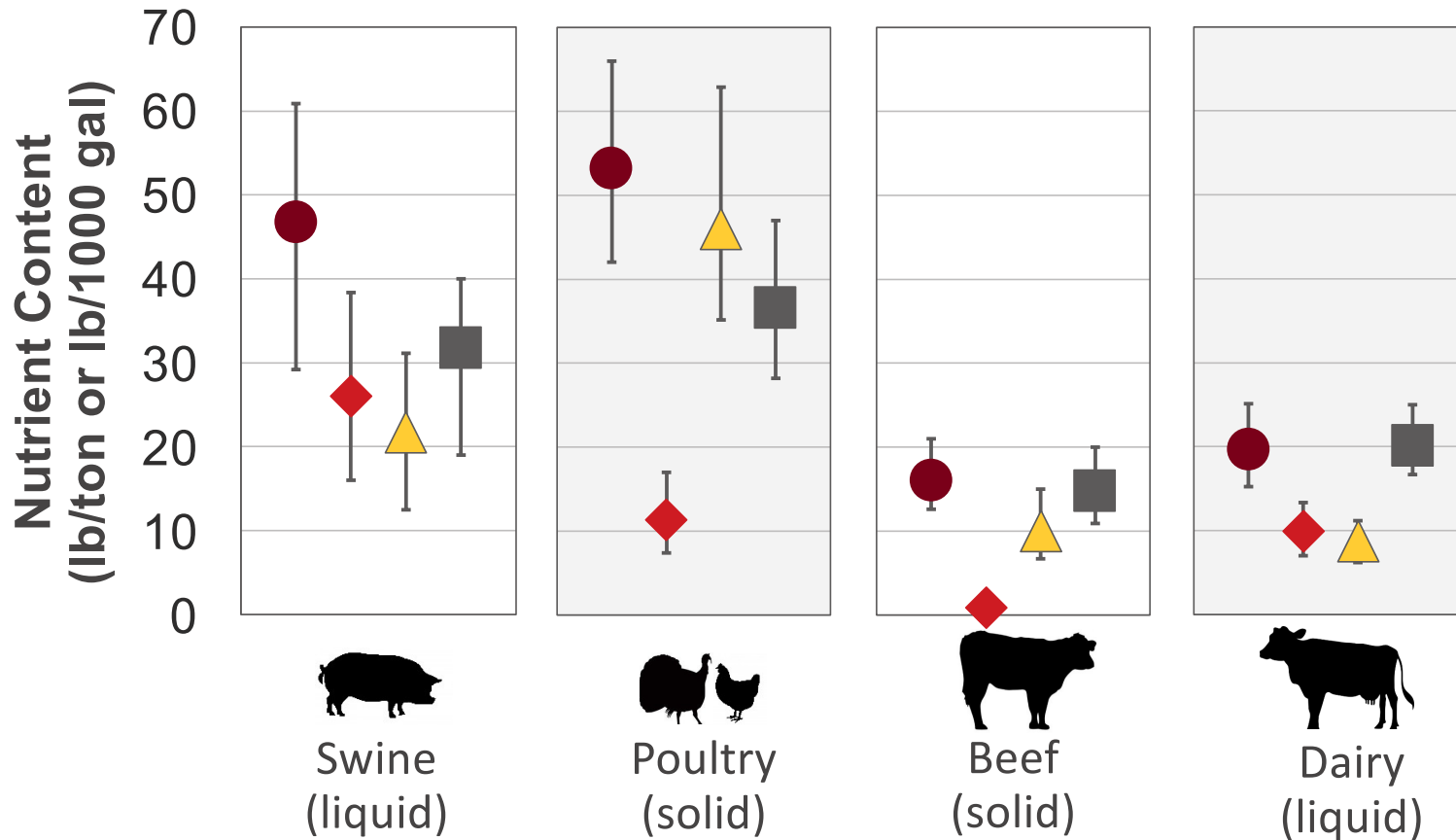


Favorable  
nitrogen to  
phosphorus  
(N:P) ratio



# Manure nitrogen distribution





**Key**

- Total N
- ◆ Ammonium-N
- ▲ Total P as P<sub>2</sub>O<sub>5</sub>
- Total K as K<sub>2</sub>O

**Nutrient content varies by animal type**

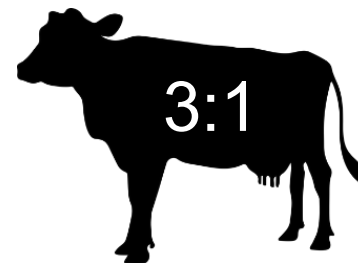
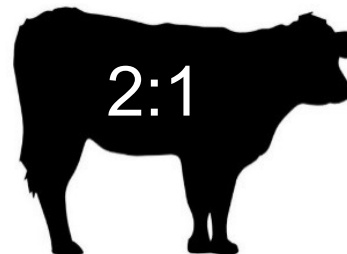
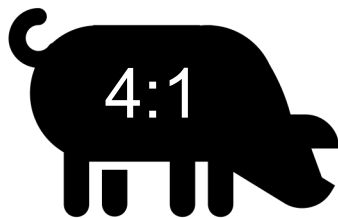
# of samples:	49,205	9,292	5,052	10,851
---------------	--------	-------	-------	--------



# Nitrogen to phosphorus ratio (P focus)

- The ratio of nutrients, particularly nitrogen (N) and phosphorus (P) is also important
- Plants take up roughly 5 units of N per unit of P

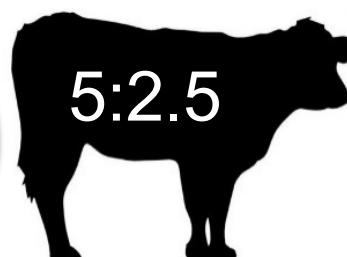
Available  
N:P ratios



# Nitrogen to phosphorus ratio (N focus)

- The ratio of nutrients, particularly nitrogen (N) and phosphorus (P) is also important
- Plants take up roughly 5 units of N per unit of P

Available  
N:P ratios



# Sidedressing research in Ohio

- Six years of on-farm swine manure drag hose plots (corn yield in bu/acre)

Year	Swine Manure	28% UAN
2014	204	204
2015	154	121
2016	222	216
2017	165	145
2018	264	246
2019	195	168
<b>6-Year Average</b>	<b>200</b>	<b>183</b>

17 bu/acre difference 

# Evaluating sidedressing in MN



1

On-farm study using a drag hose system

2

Small-plot study dragging a hose over corn at different growth stages

3

On-farm study using a tanker at different corn growth stages

4

Small-plot study using a tanker with different application equipment

# Sidedressing with a dragline system

## Corn-Corn-Soybean

- 40 lbs N in starter
- Sidedressed 140 lbs N at V4/V5 stage
- Compared:
  - Swine manure with dragline (~3,500 gal per acre)
  - Anhydrous ammonia
  - Liquid UAN (32%)
  - No N sidedressed







# Sidedressing Manure - 2018



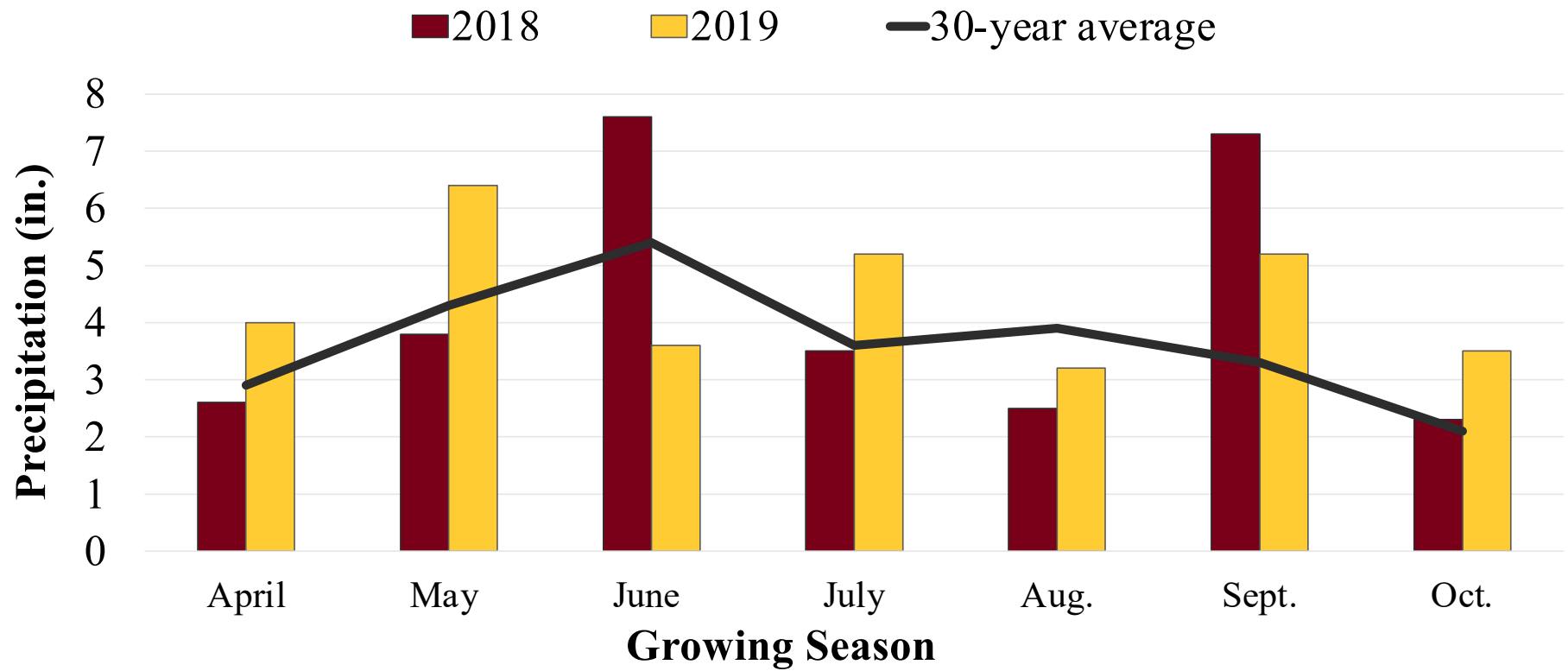


# Sidedressing Manure - 2019

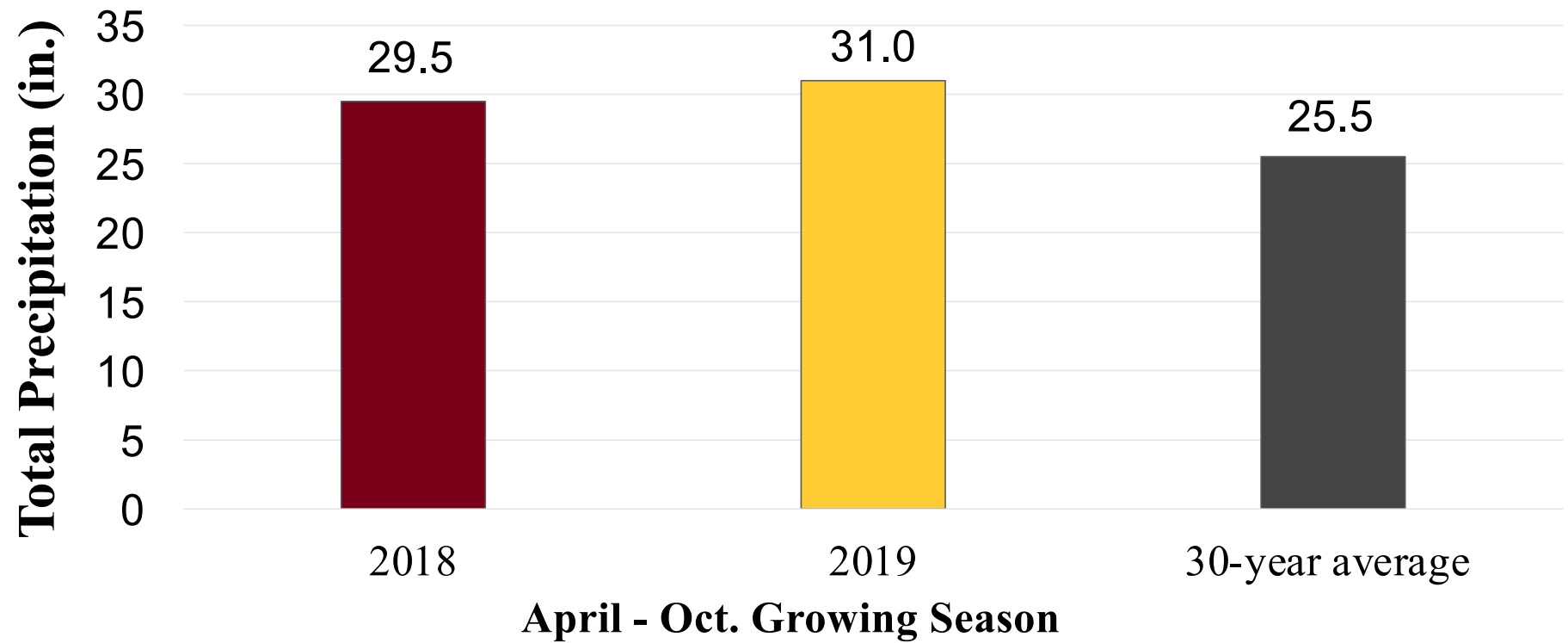


Anhydrous Control UAN Dragline LSM UAN Control

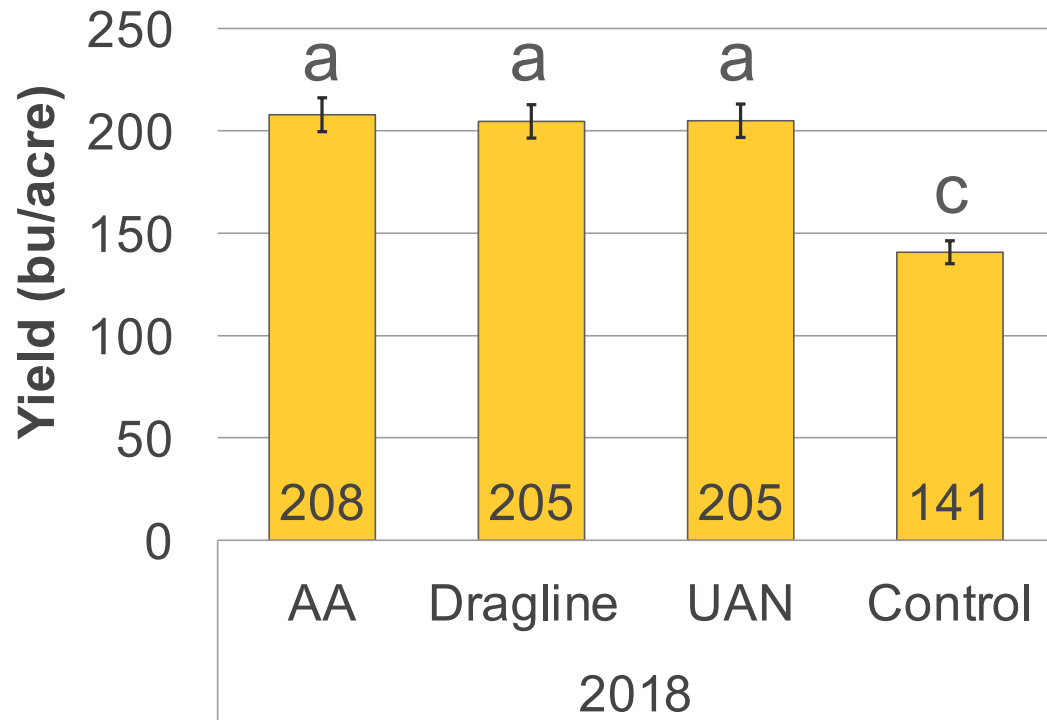
# Weather Data Gaylord MN



# Total Growing Season Precipitation Near Site



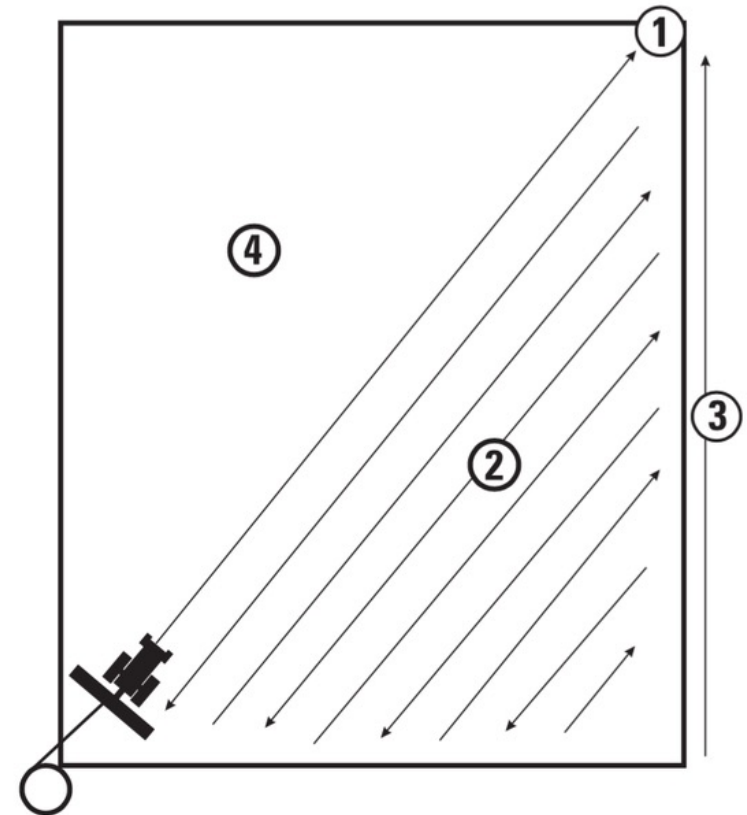
# Corn Yields




Treatments within years

# What about doing this to a whole field?

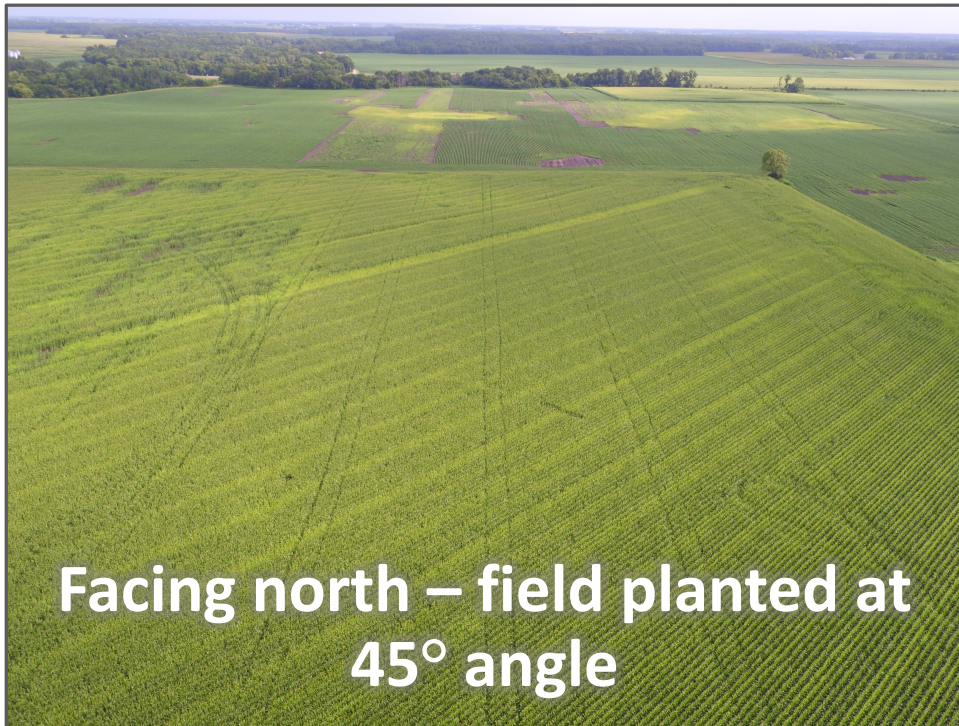
- Manure applicators tend to apply manure at a 45° angle
  - Allows enough slack in the hose to finish first half
- Consider planting field at 45° angle?





**Example of  
applying at an  
angle**

# Whole 40 acres planted at an angle

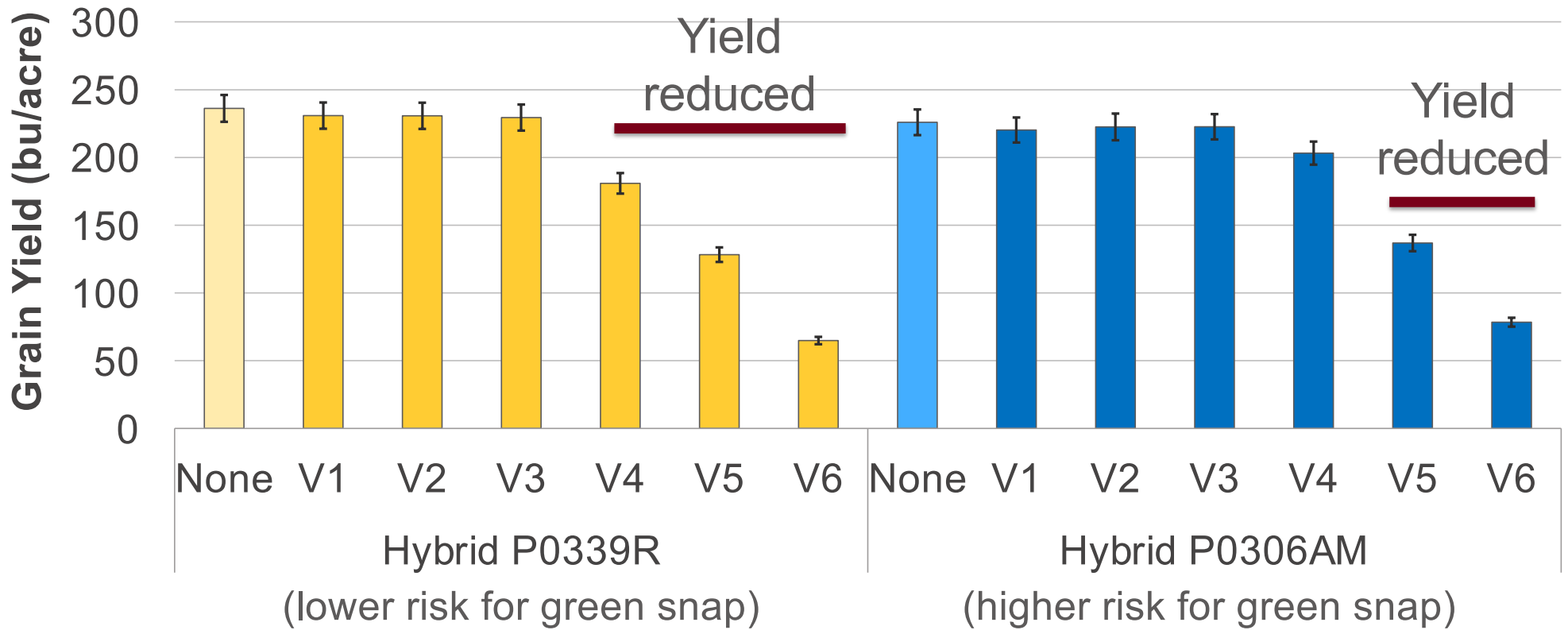


# When can you safely drag corn?





# Grain Yield



# Can you sidedress with a tanker?

## Corn-Corn-Soybean

- 40 lbs N in starter
- Sidedressed 155 lbs N (~4,000 gal per acre)
- Compared:
  - Swine manure with tanker at:
    - V1, V4, V7 (missed V1 in 2021)
  - Anhydrous ammonia at V4/V5

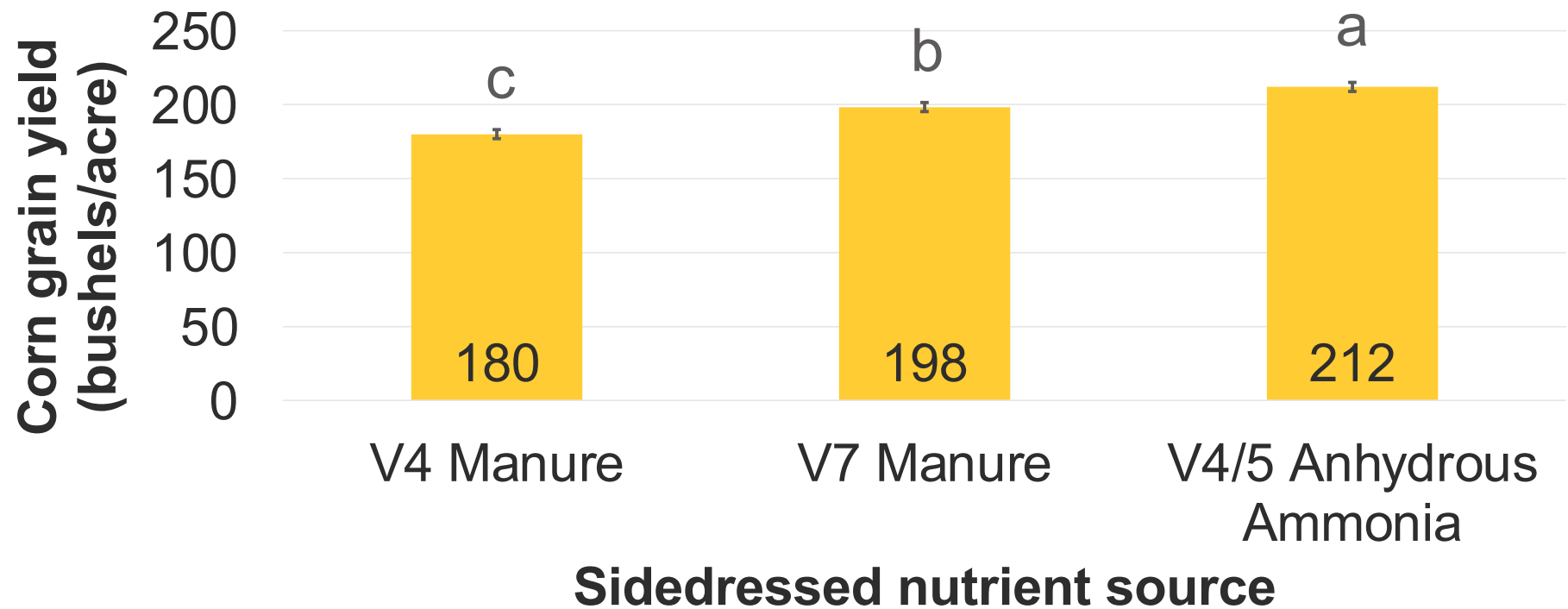


# October 2021



V7 Manure V7 Manure Anhydrous V4 Manure Anhydrous

# Corn yield when sidedressing with a tanker



# Tire tracks and compaction?



# Does application equipment matter?

## Soybean-corn rotation

- 40 lbs N in starter fertilizer
- Sidedressed dairy manure at Rosemount, MN and swine manure at Waseca, MN
- Compared V1 or V6 application timing:
  - Manure sweep injected
  - Manure disk injected
  - Manure surface broadcast
  - Urea with urease inhibitor
  - No-nitrogen control

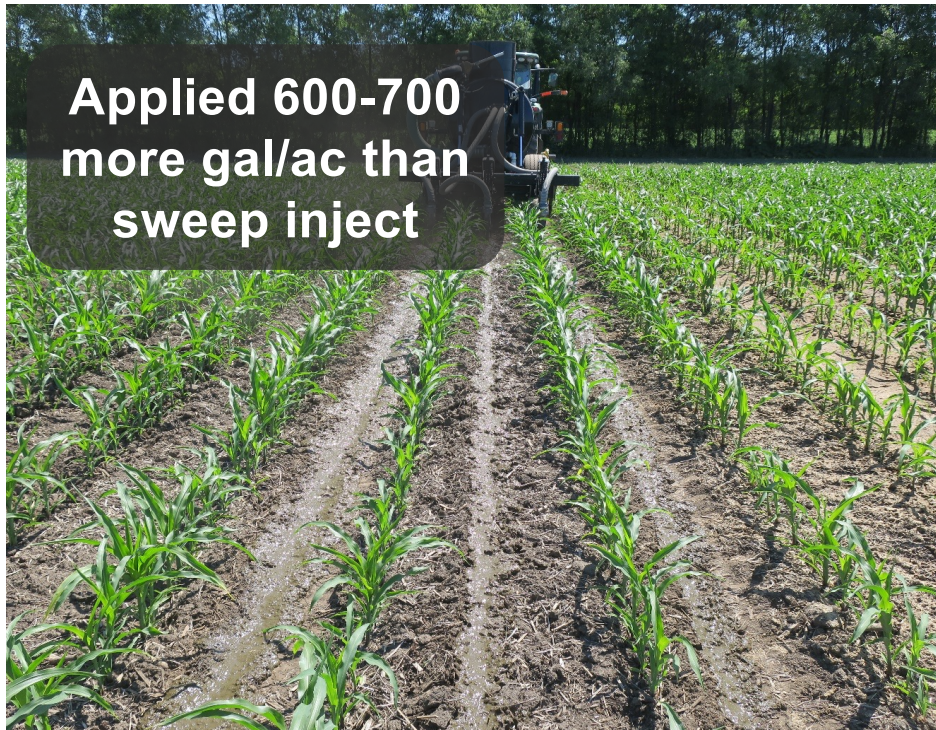


# Sweep injection



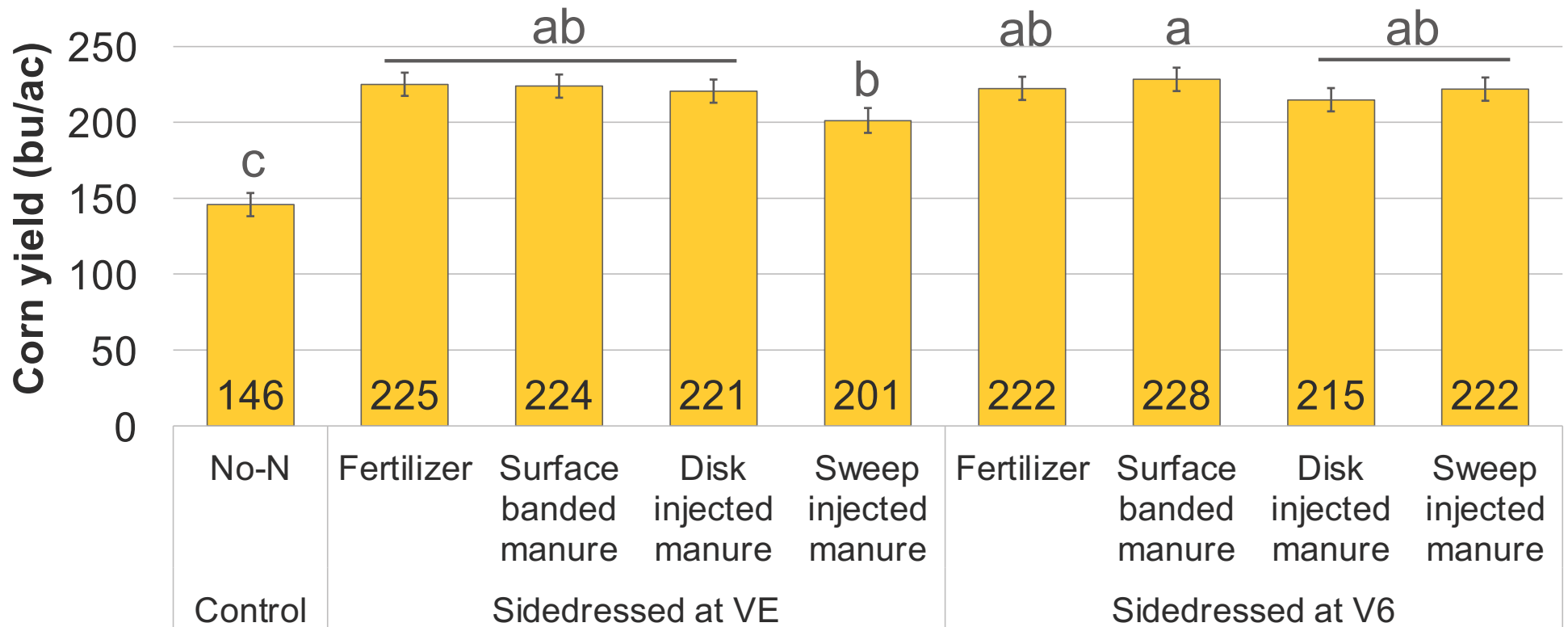
Applied about  
5,000 gal/ac for  
swine or 7,000  
gal/ac for dairy

# Disk injection and broadcast

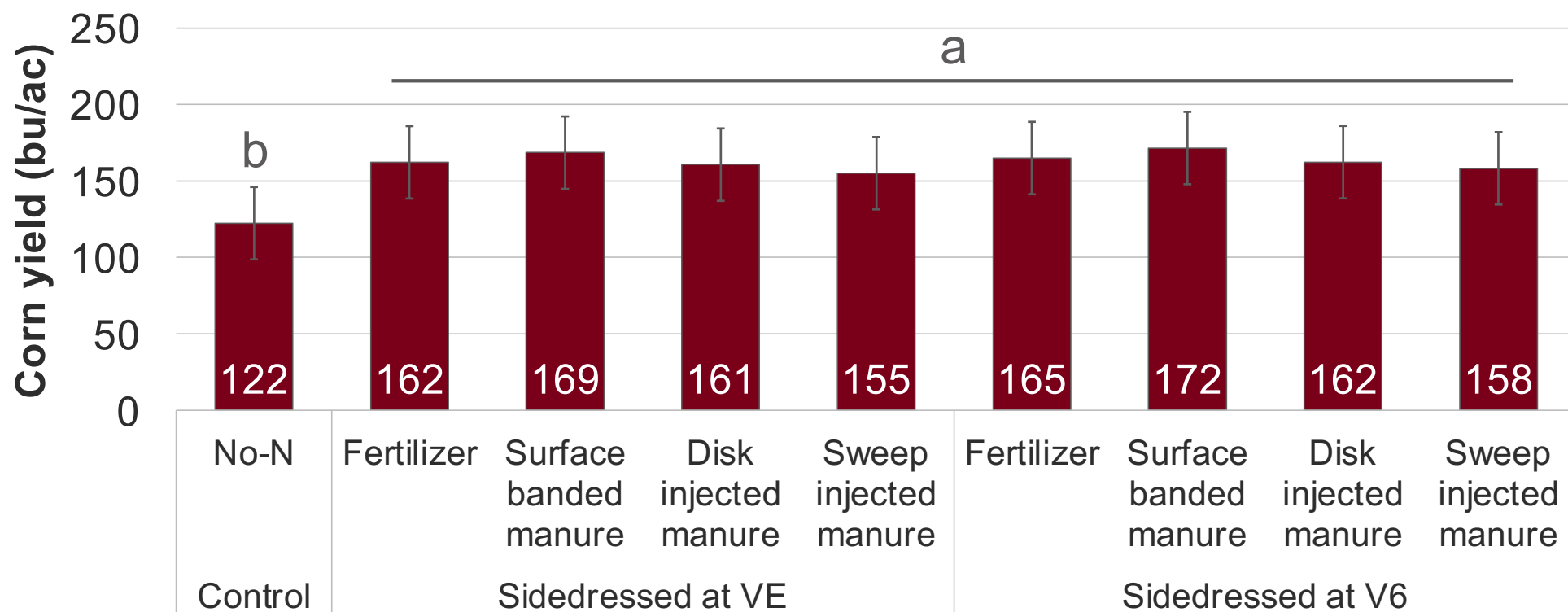




# Corn yield at Waseca with swine manure



# Corn yield at Rosemount with dairy manure



# Lessons learned

Sidedressing  
liquid  
manure into  
corn:



# What's coming down the pipeline?









UNIVERSITY OF MINNESOTA EXTENSION

Driven to Discover<sup>SM</sup>

# Thank you!

**Funding:** Thanks to the MN Pork Board and MN Soybean Research and Promotion Council for initial funding and USDA-NIFA Grant 2020-68008-31410 for helping us continue the work.

**Contact Info:** [mlw@umn.edu](mailto:mlw@umn.edu)

- Follow me on  : @ManureProf
- <https://z.umn.edu/ManureSidedressing>



© 2024 Regents of the University of Minnesota. All rights reserved.

The University of Minnesota is an equal opportunity educator and employer. This PowerPoint is available in alternative formats upon request at 612-624-1222.

MAKING A DIFFERENCE IN MINNESOTA: ENVIRONMENT + FOOD & AGRICULTURE + COMMUNITIES + FAMILIES + YOUTH