



# Long Term Cropping Systems Research at NDSU-CREC.

Agriculture

from

Everything

**Ezra Aberle**  
**North Dakota State University**  
**Carrington Research Extension Center**

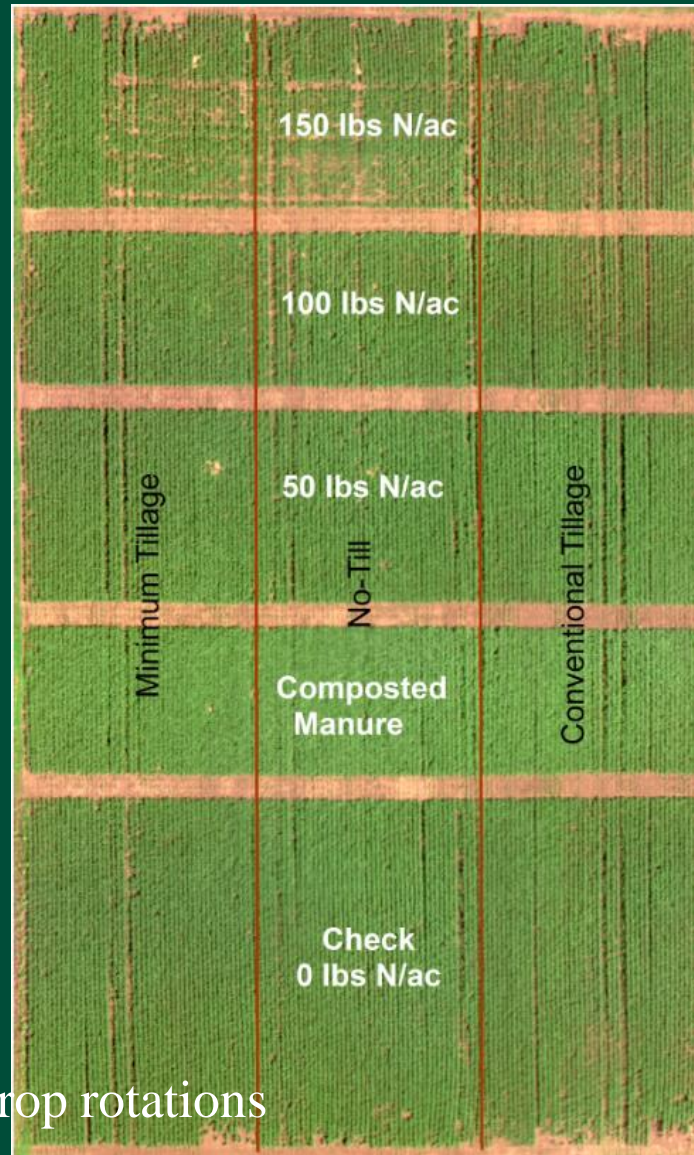
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# Long-Term Cropping System Study - Carrington REC



- Started in 1987
- Area about 50 acres
- Cycles of three 4-year crop rotations
- 9<sup>th</sup> cycle ended in 2022

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## 2022 Cropping Systems Map

Rotation 1 = HRSW/Sunflower/Barley/Soybean

Rotation 2 = HRSW/Field Pea/Corn/Soybean

Rotation 3 = HRWW/Corn/Soybean/HRSW

Rotation 3CC = HRWWCC/CornCC/SoybeanCC/HRSW

**N**

T = Conventional Tillage

M = Minimum Tillage

N = No Tillage

Barley

Corn

Field Peas

Soybean

Sunflower

HRSW

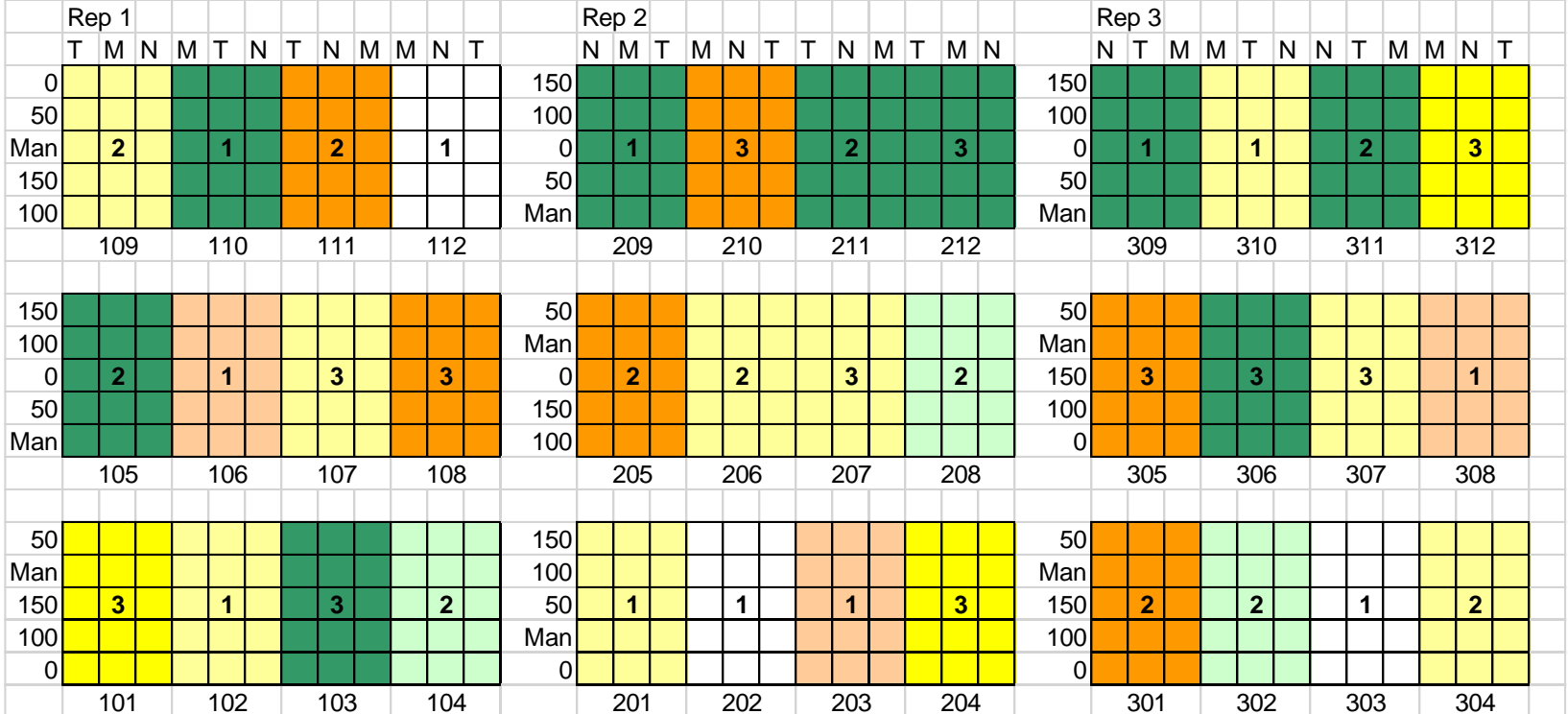
HRWW

0 = 0 lbs. N    50 = 50 lbs. N as Urea

Man = 50 lbs. N as Manure

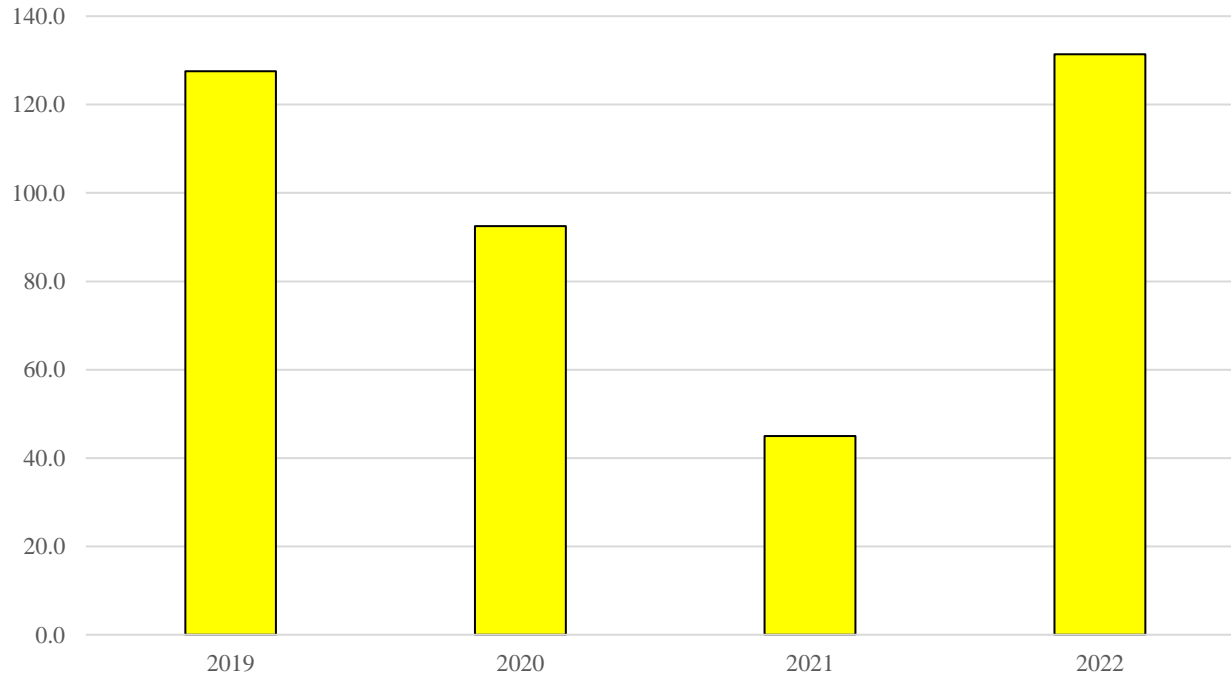
100 = 100 lbs. N as Urea

150 = 150 lbs. N as Urea



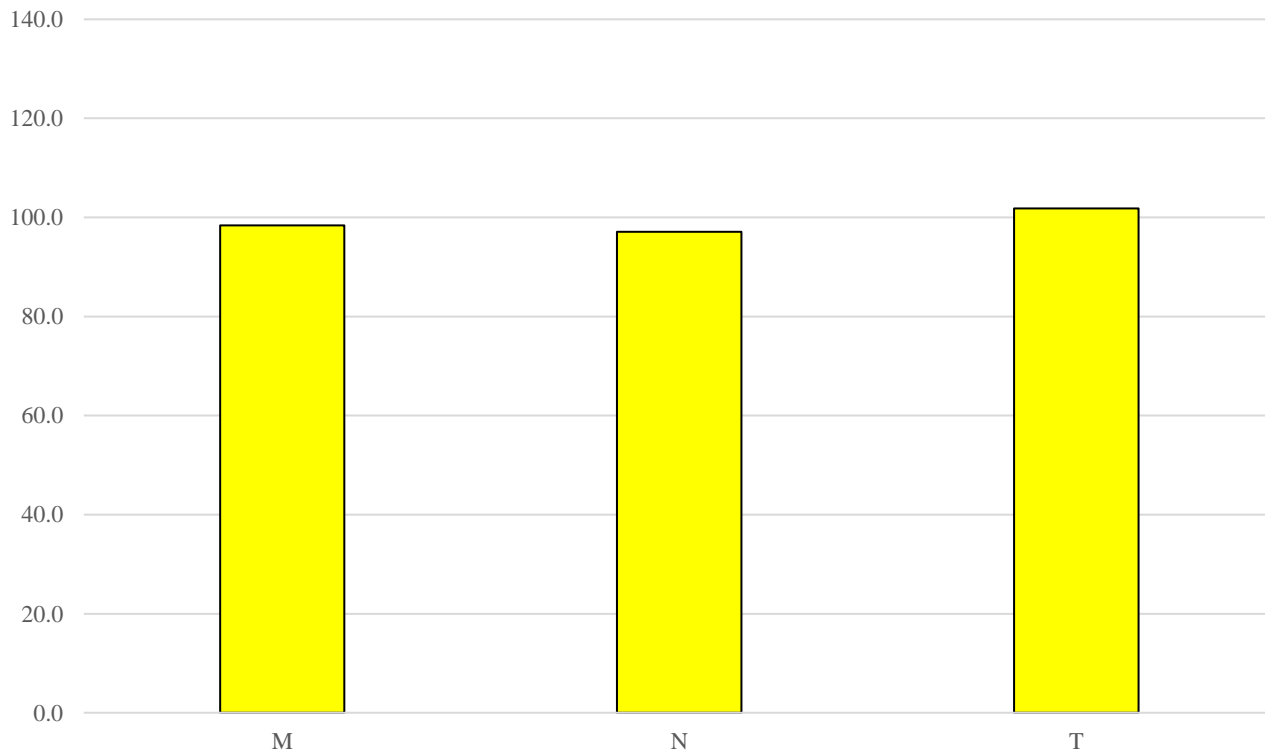
# Cycle 9 (2019-2022) Highlights

Yearly corn yield Bu/A across N fertility treatments & tillage system



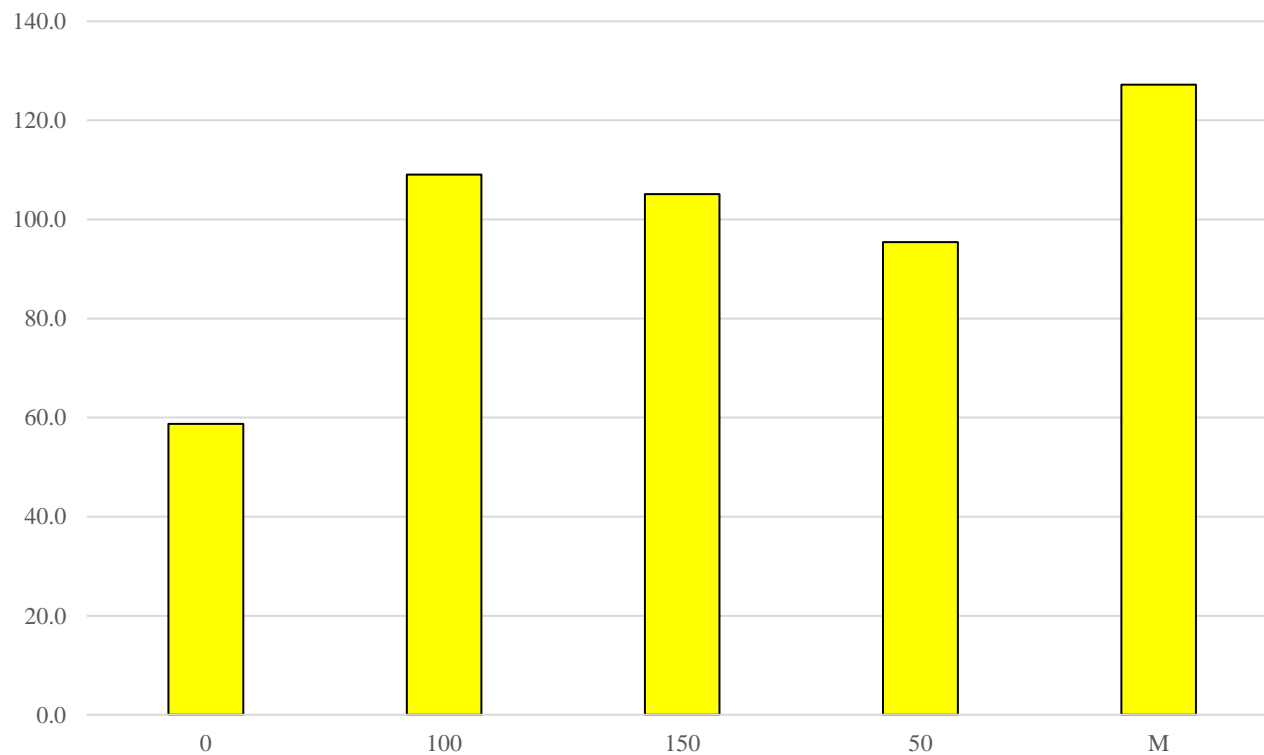
# Cycle 9 (2019-2022) Highlights

Tillage corn yield Bu/A across year & N fertility treatments

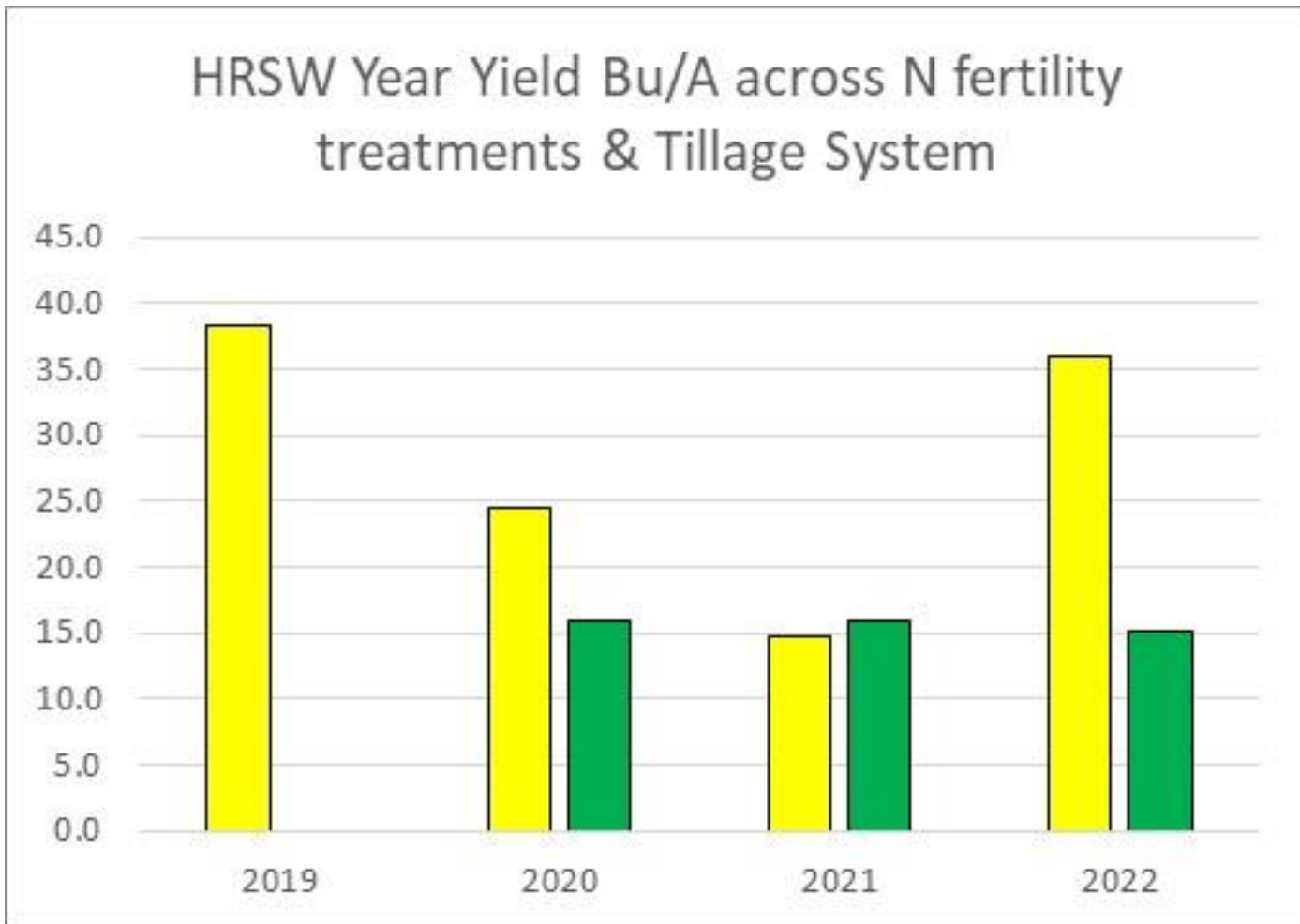


# Cycle 9 (2019-2022) Highlights

N fertility treatment corn yield Bu/A across year & tillage system

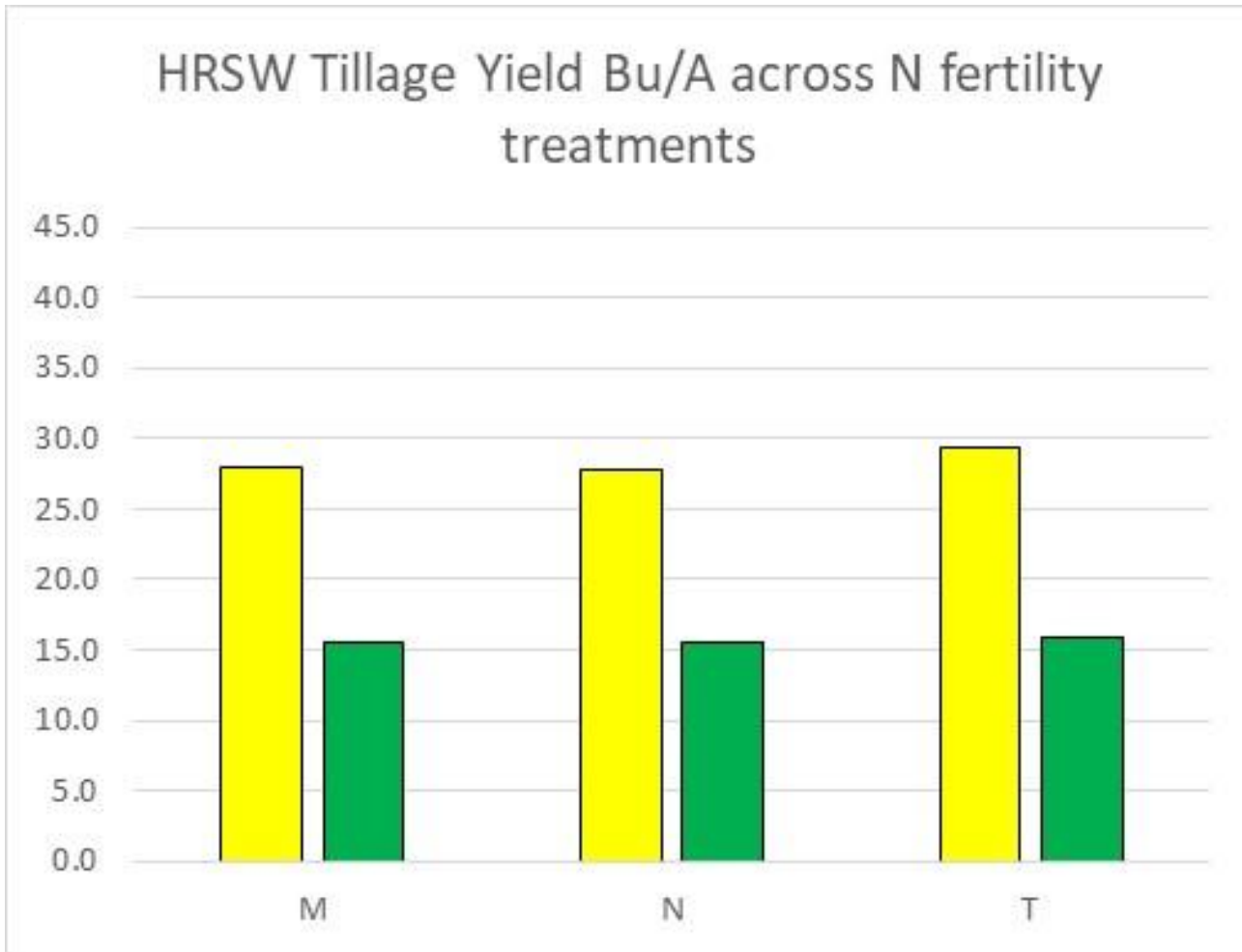


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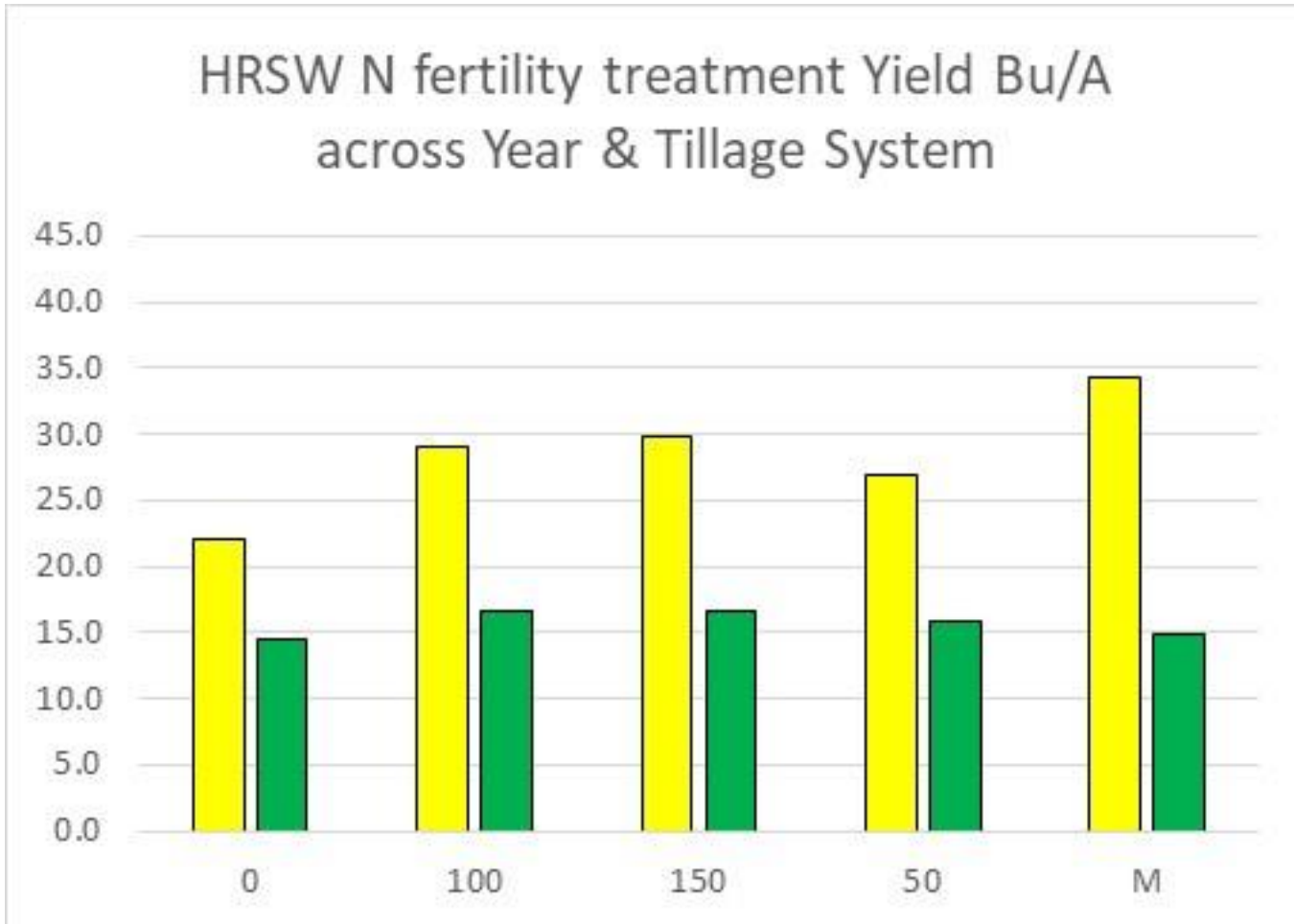




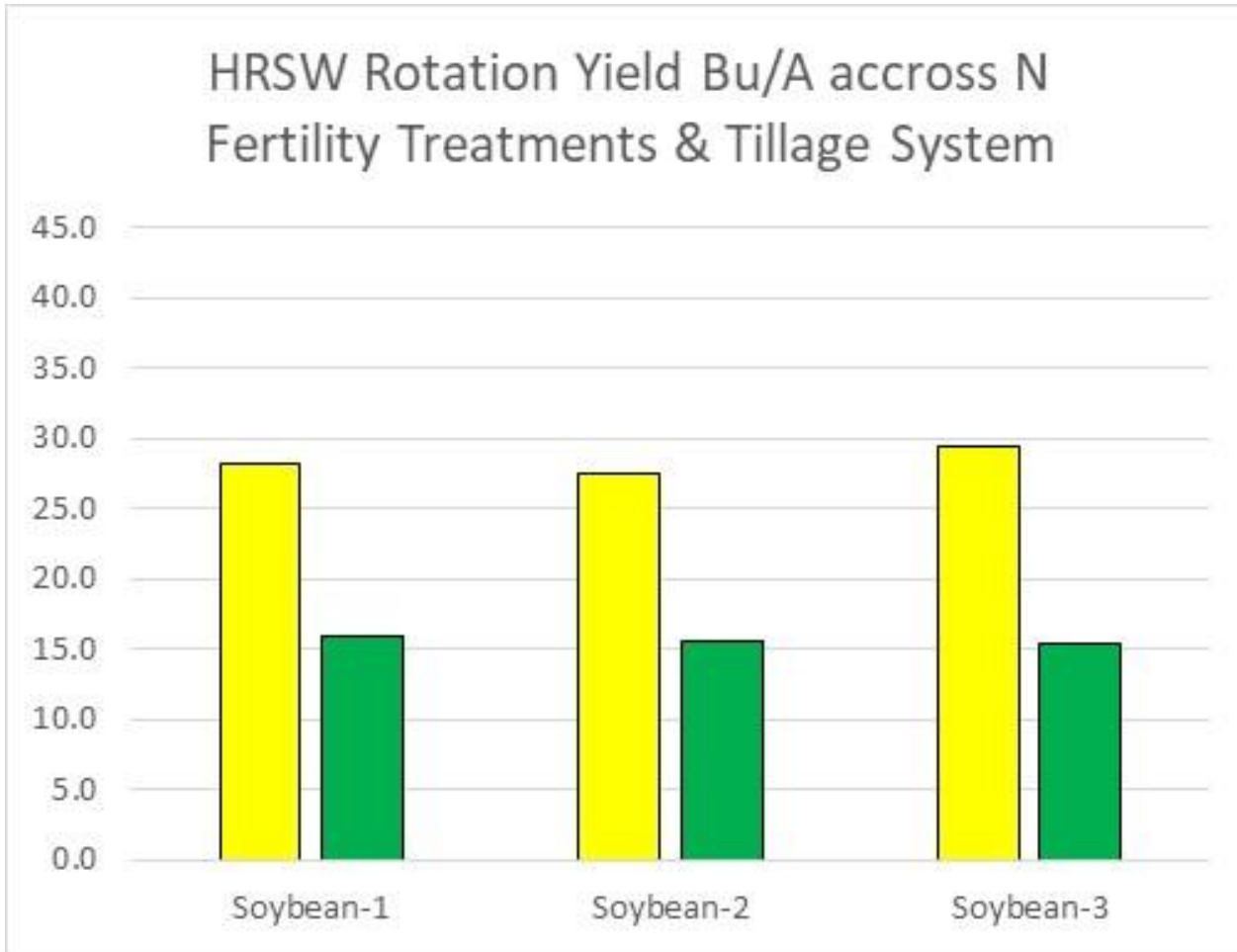
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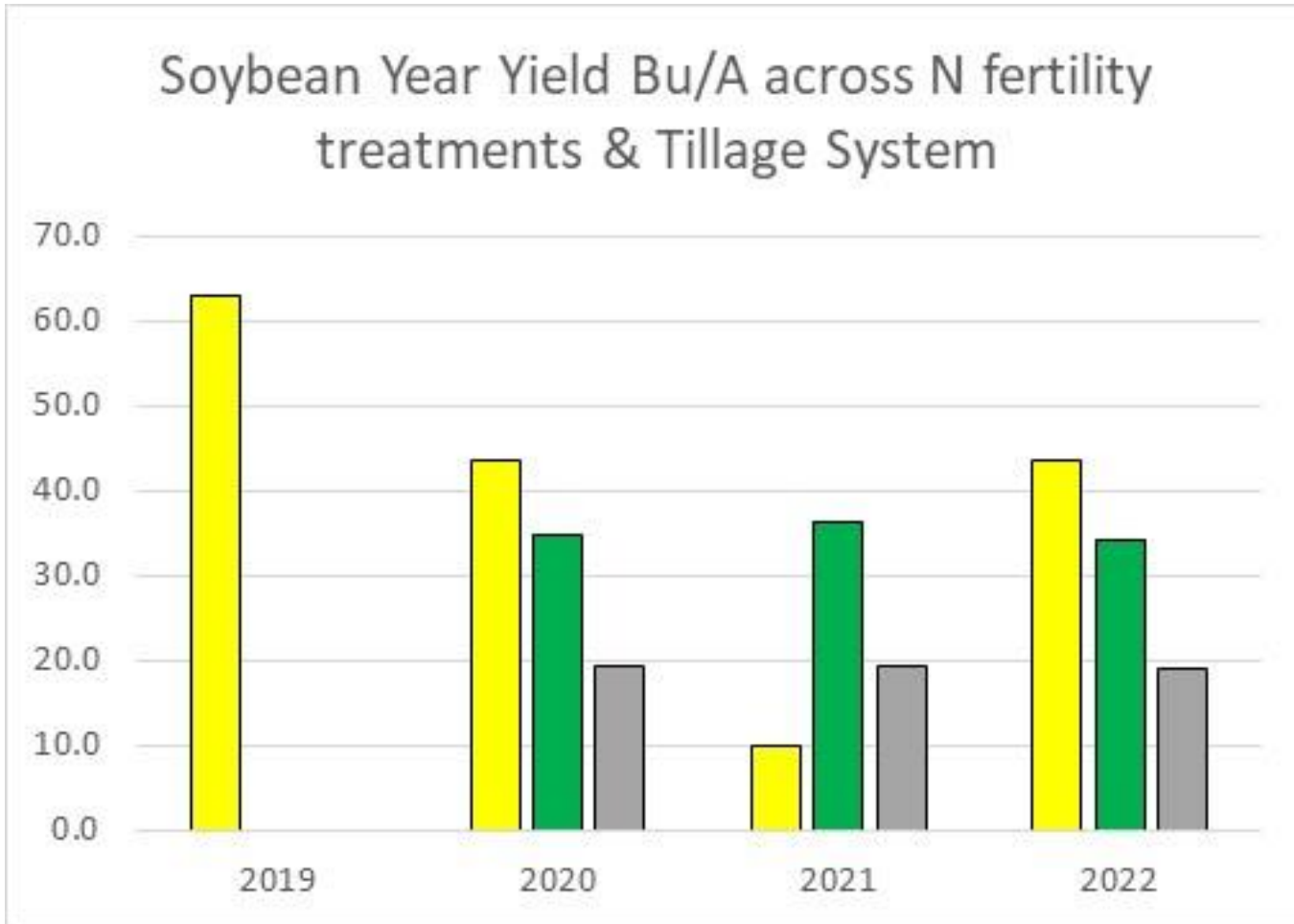
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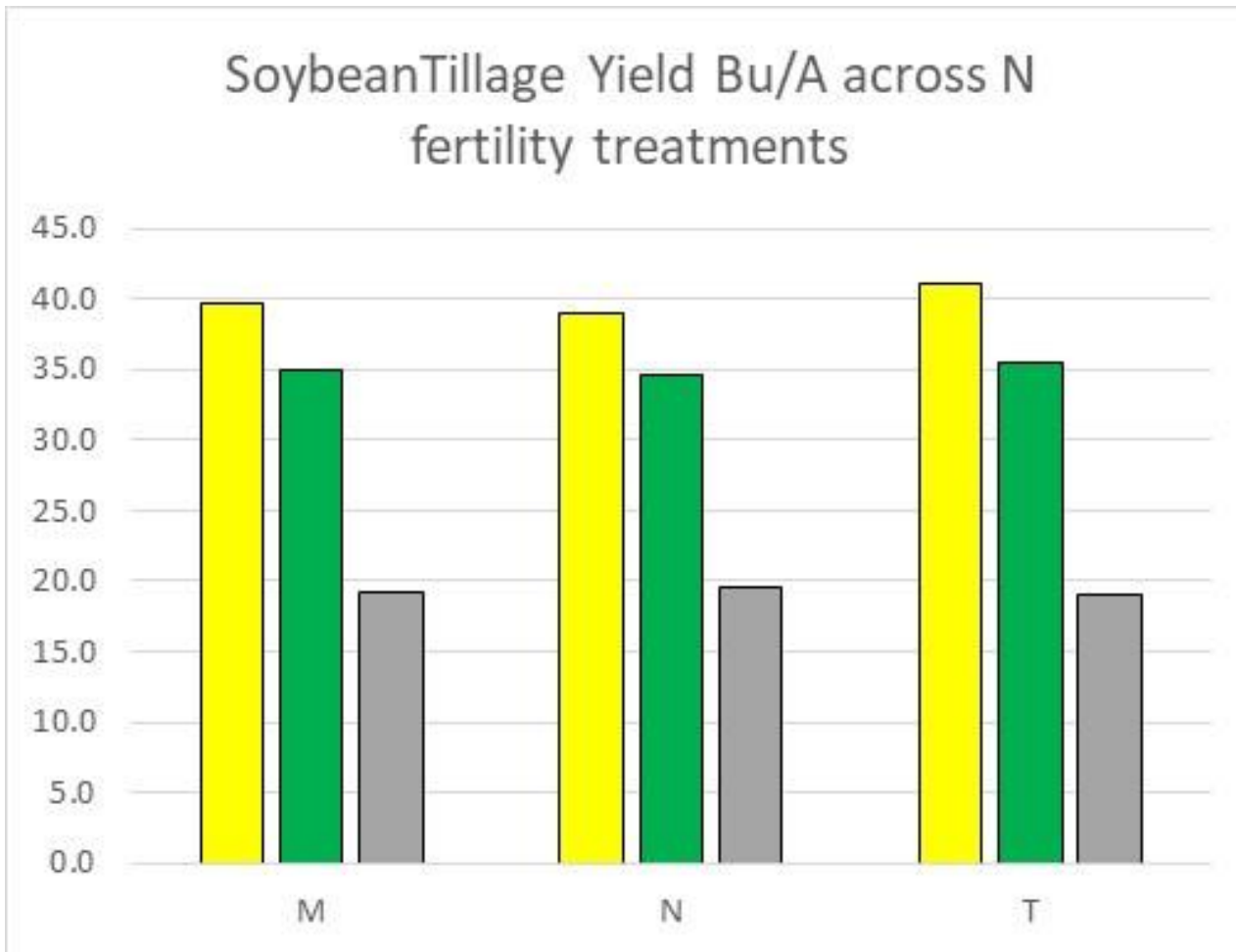
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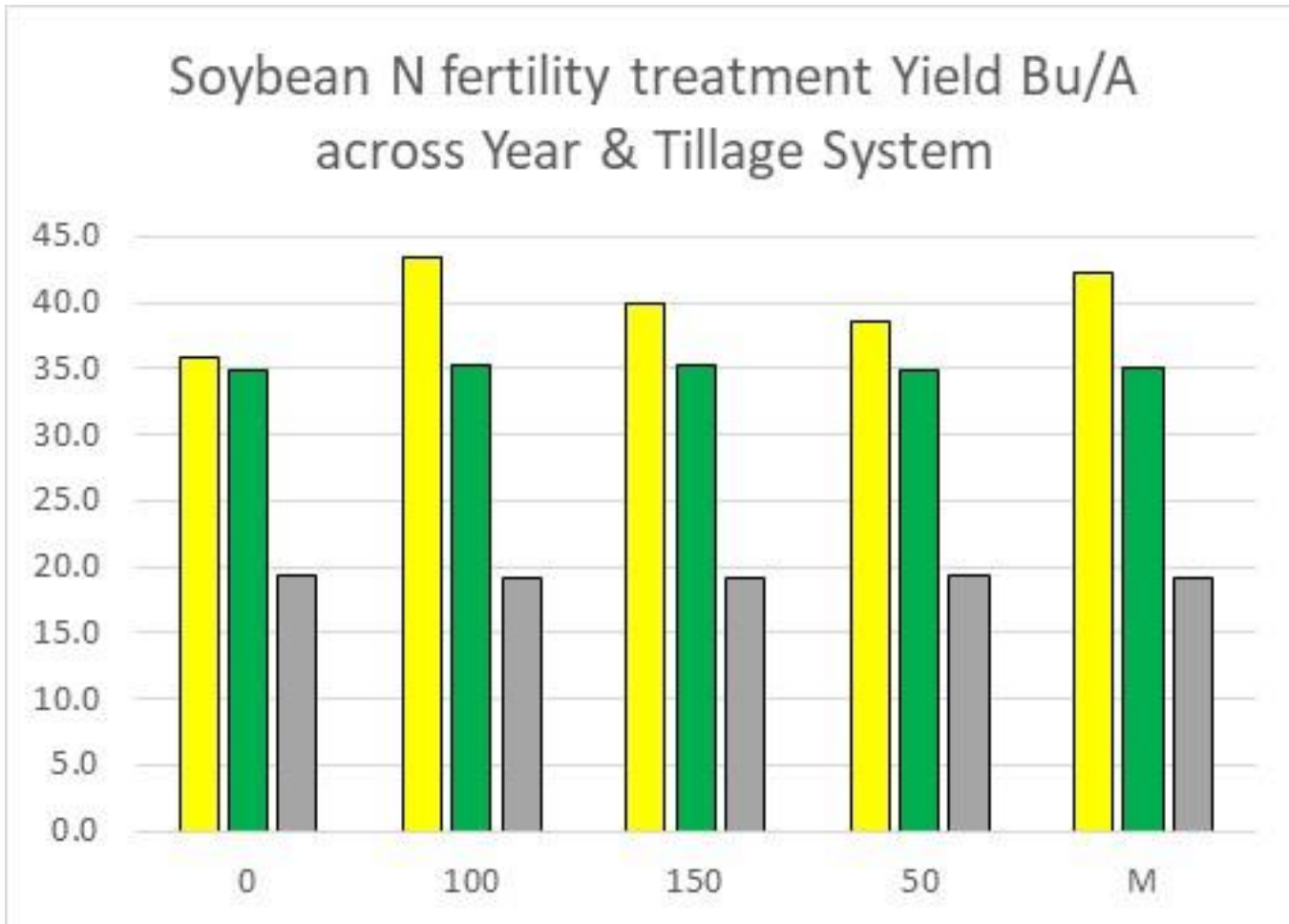
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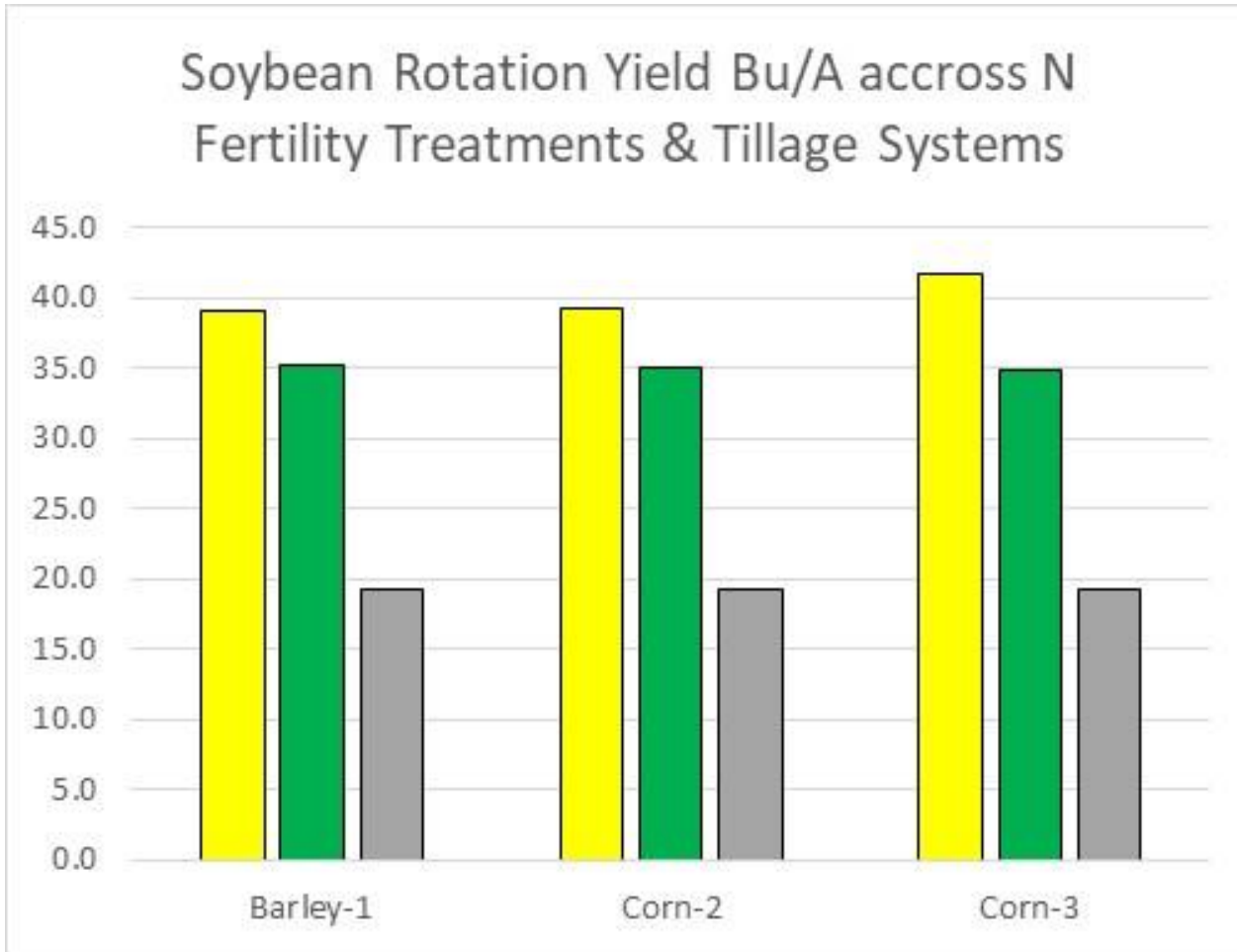
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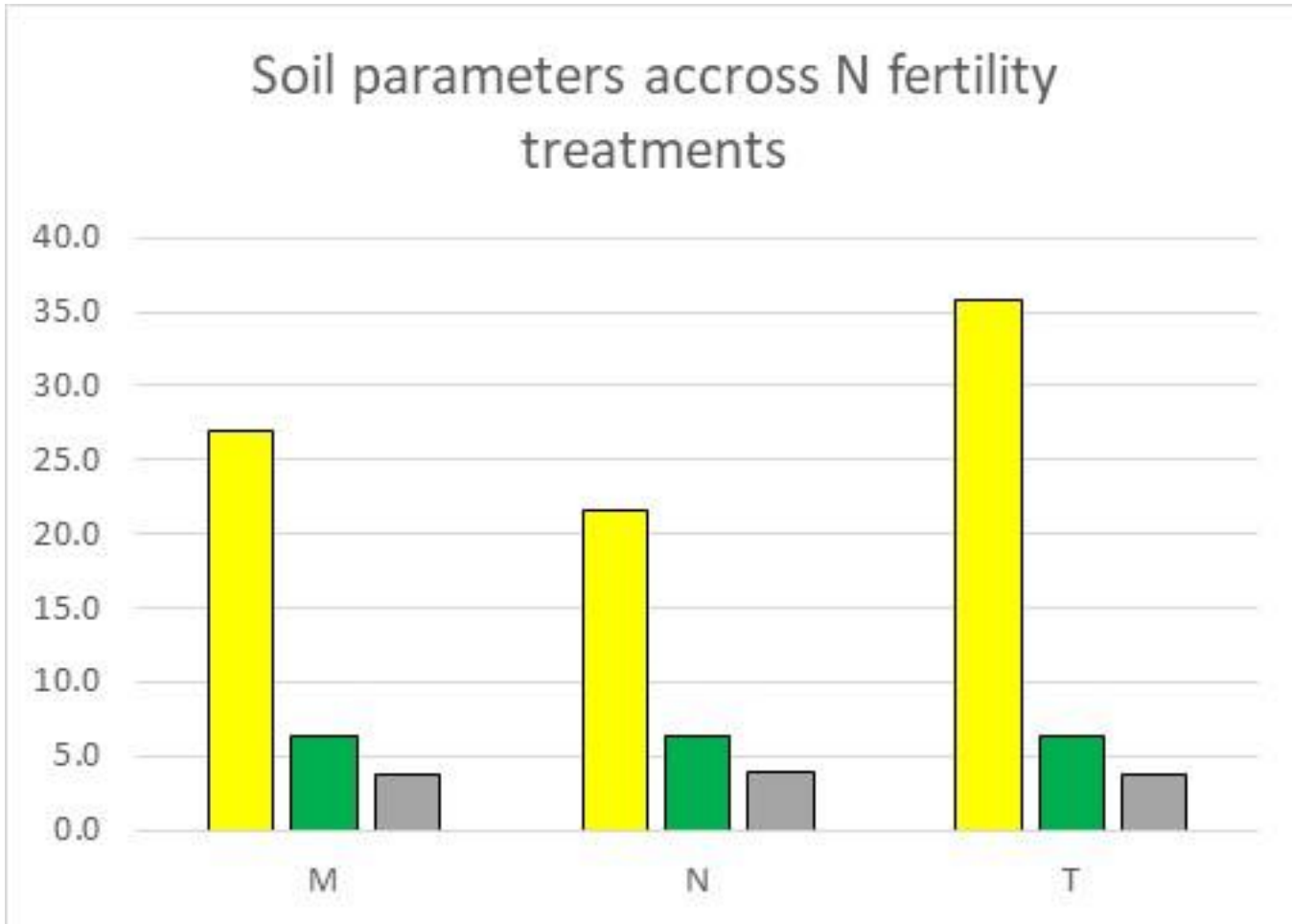


# Cycle 9 (2019-2022) Highlights

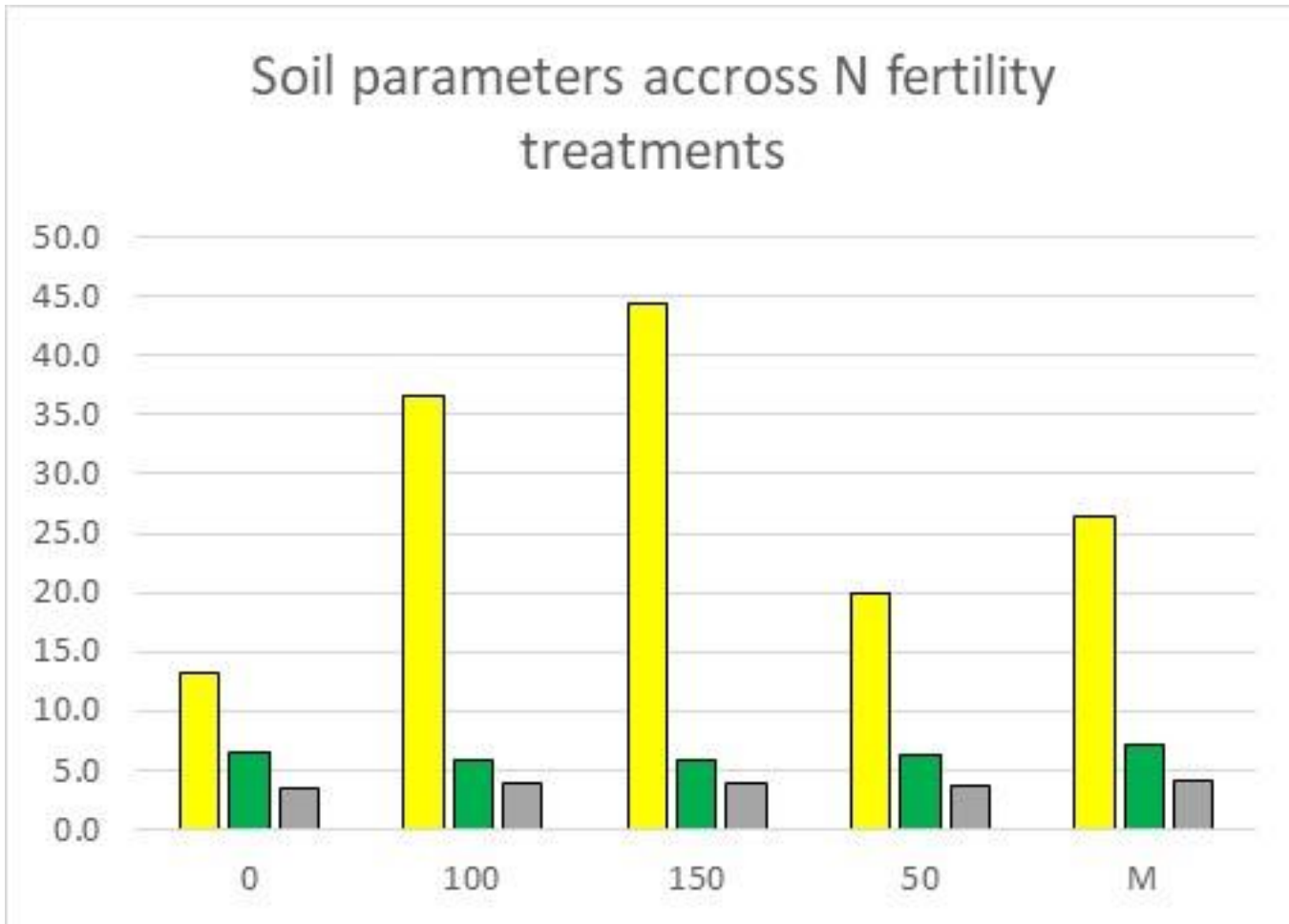
- HRSW yields are 2.0 bu higher following soybean in rotation 3 vs rotation 2.
- Corn and soybean yields are equivalent for all rotations.
  - Field pea has a significantly higher yield (3.8 bu/acre) in plots that previously received composted manure than non-manure plots.
  - Soybean has a significantly higher yield (2.3 bu/acre) in plots that previously received composted manure than non-manure plots.
  - Corn has a significantly higher yield (11.6 bu/acre) in plots that previously received composted manure than non-manure plots except the 150lb N rate.
  - HRSW have significantly higher yields (4.4 bu/acre) in plots that previously received composted manure than non-manure. However, HRSW protein was 0.9 lower at 14.9% and HRWW protein was 1.5 lower at 12.6% than commercially fertilized plots.



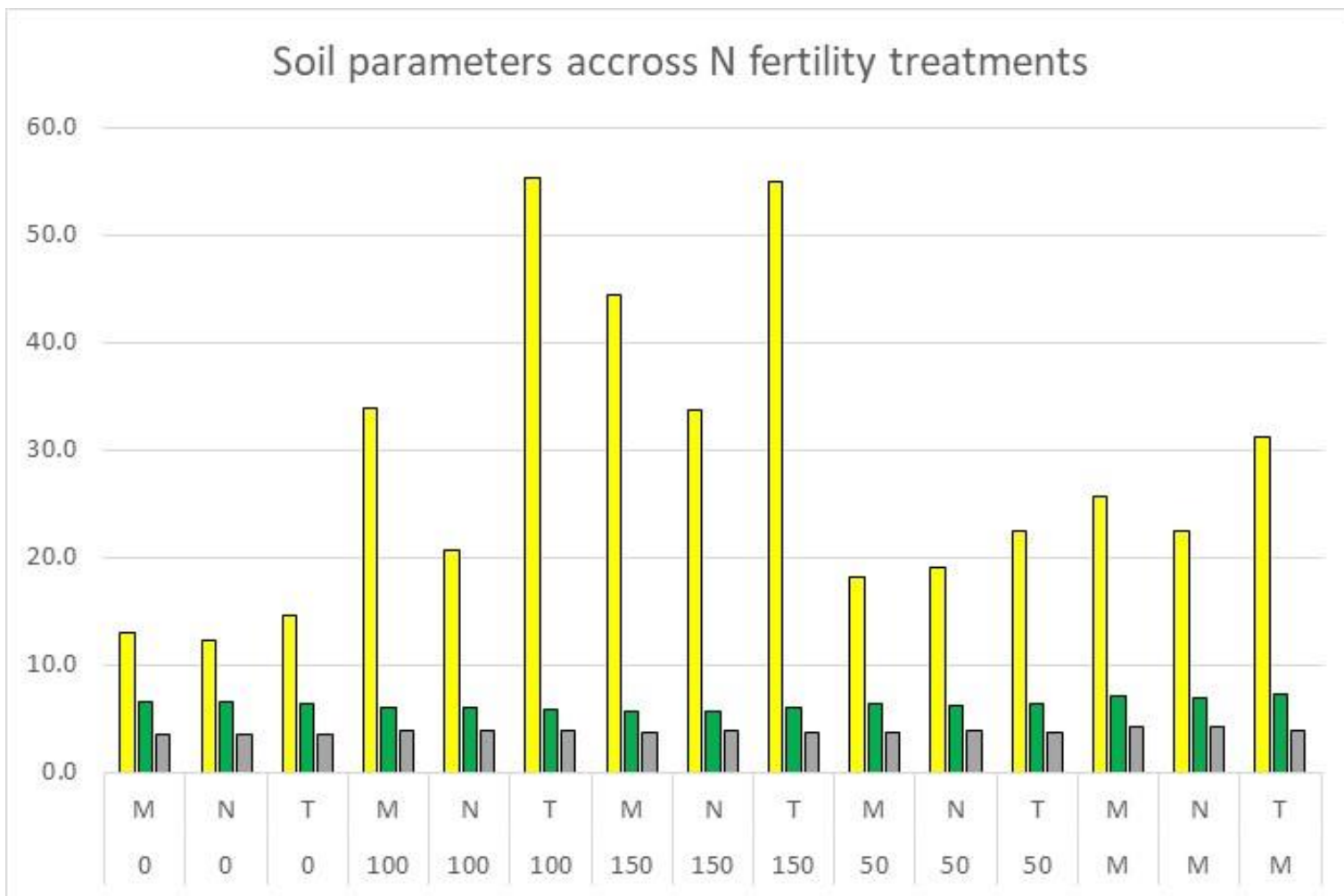
# 2008 Soil Highlights



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# Cycle 9 (2019-2022) Highlights

- Composted manure plots have significantly higher organic matter content at 4.1% than the 150 lbs. urea plots at 3.8%, the 100 lbs. urea plots at 3.9%, the 50 lbs. urea plots at 3.8%, and the no fertilizer plot at 3.5%.
- Composted manure plots have significantly higher soil pH at 7.1 than the 150 lbs. urea plots at 5.8, the 100 lbs. urea plots at 6.0, the 50 lbs. urea plots at 6.4 and the no fertilizer plot at 6.5.
- The no-till system has significantly higher organic matter content at 3.9% than conventional tillage at 3.8%, and minimum tillage at 3.8%.
- No-till plus composted manure plots had the highest organic matter content at 4.2%



# Questions?



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