

# NITROGEN RATE AND TIMING CONSIDERATIONS FOR SWEET CORN

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# OUTLINE

- Current guidelines and issues
- Results from on-farm research
- Results from Hancock ARS research
- Conclusions

# CURRENT UW-GUIDELINES

Soil organic matter (%)	Nitrogen rate (lb ac <sup>-1</sup> )
<2%	150
2 to 9.9%	130
10 to 20%	110
>20%	70

- Current grower practices include higher rates, but with multiple split applications
- University of Minnesota recommendations are higher, 170 lb ac<sup>-1</sup> on sandy soils, but based on limited work
- Should N recommendations be changed?

# ON-FARM RESEARCH, CENTRAL SANDS

## Objective:

- Determine the optimal N rate for irrigated, sandy soil sweet corn with six split applications

## Collaborators:

- Seneca Foods, Don Genrich (UWEX-Adams Co.), Ken Schroeder (UWEX-Portage Co.), NRCS Golden Sands RC&D,

# ON-FARM RESEARCH, CENTRAL SANDS

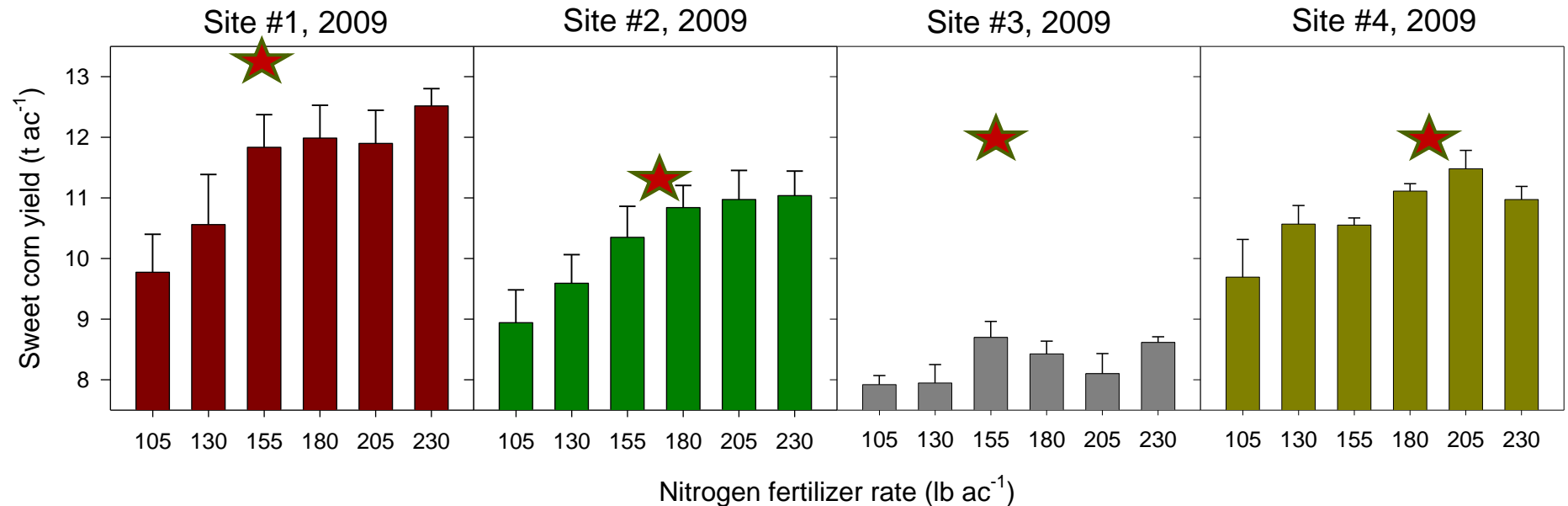
- Cooperating growers
- Six N applications
  - Preplant
  - Urea
  - Ammonium Sulfate
  - **Anhydrous Ammonia**
  - Fertigate
  - Fertigate

Applied N	Total N
lb ac <sup>-1</sup>	lb ac <sup>-1</sup>
0	105
25	130
50	155
75	180
100	205
125	230

2009: hand applied ammonium sulfate

2010: hand applied ammonium sulfate + gypsum

# N RATE – 2009 ON-FARM



Two sites with classic response curves

One site with yield peak at N rate above recommended

One site with no explanation

# N RATE – 2010 ON-FARM

Harvest date: 7/28

8/10

9/1

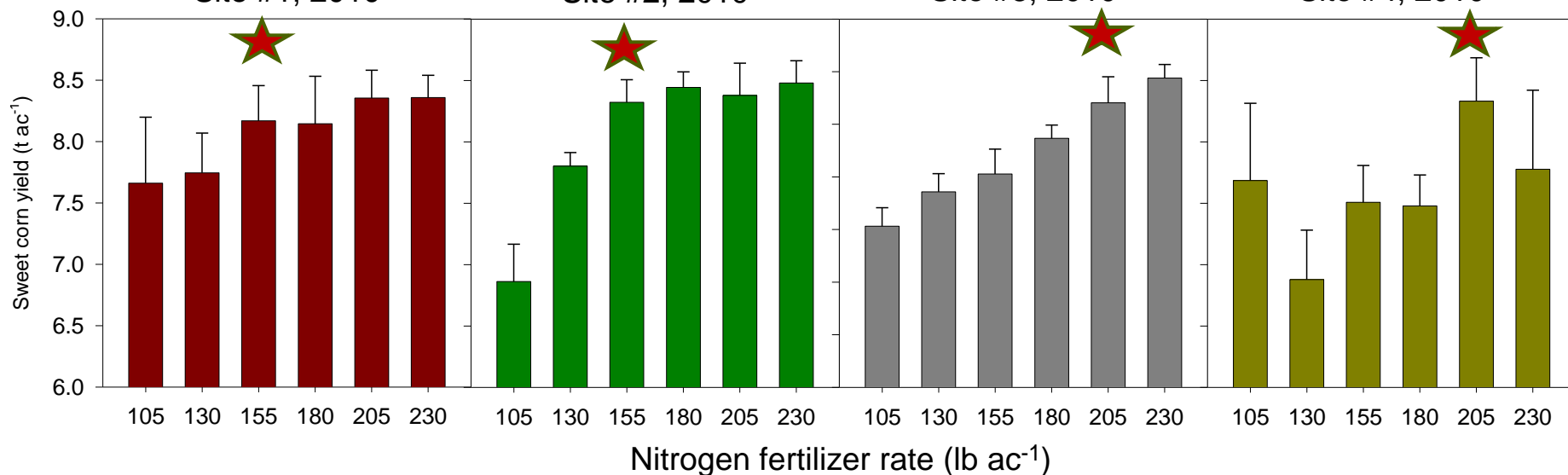
9/8

Site #1, 2010

Site #2, 2010

Site #3, 2010

Site #4, 2010



- Earlier planting dates – current recommendations work great
- Later plantings...
  - Future question – does planting date effect optimal N rate?

# OTHER PARAMETERS

- Ears per plant
- Ears per acre
- Ears per ton / yield per ear
  
- No differences in these parameters were detected
- Too much variability?
- Split applications providing adequate fertility

# ON-FARM RESEARCH, GREEN LAKE COUNTY

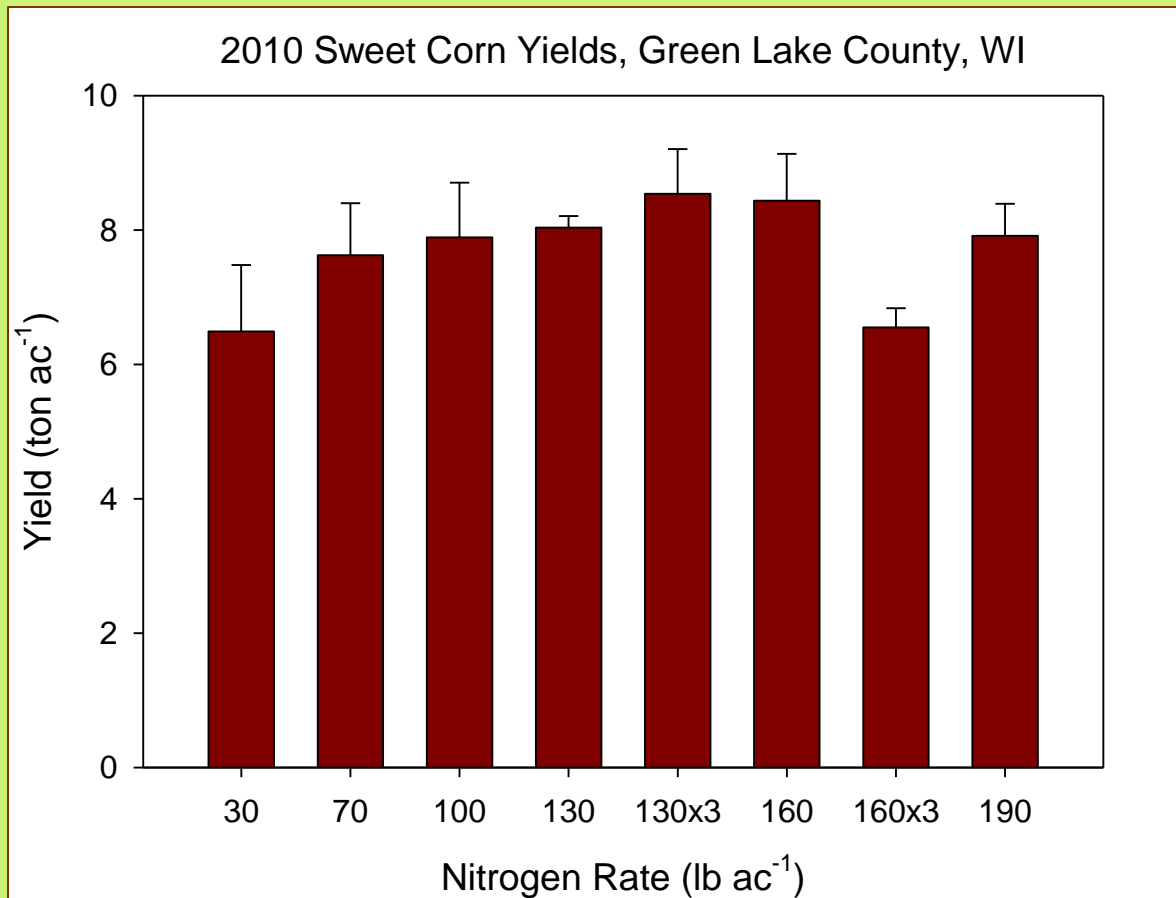
## Objective

- Evaluate the effect of nitrogen rate and timing on non-irrigated sweet corn yields
- A.J. Bussan & Company, Mike Rankin (UWEX-Fond du Lac Co.)

## Design:

- Eight rates
- 30 lb ac<sup>-1</sup> at V5, remainder at emergence
- Split applications of 130 & 160 had 30 lb ac<sup>-1</sup> at tassel

# ON-FARM RESEARCH, GREEN LAKE COUNTY



**Yields maxed at  
130 lb ac<sup>-1</sup> of N**

# ON-FARM RESEARCH, GREEN LAKE COUNTY



**Barley planted after harvest shows residual nitrogen**

**photo courtesy of Mike Rankin**

# HANCOCK RESEARCH

Three studies

- Nitrogen rate (7) X variety (2)
- Density (4) X N rate (2) X variety (2)

Collaborator:

- A.J. Bussan (UW-Horticulture)

Funding:

- Midwest Food Processors Association

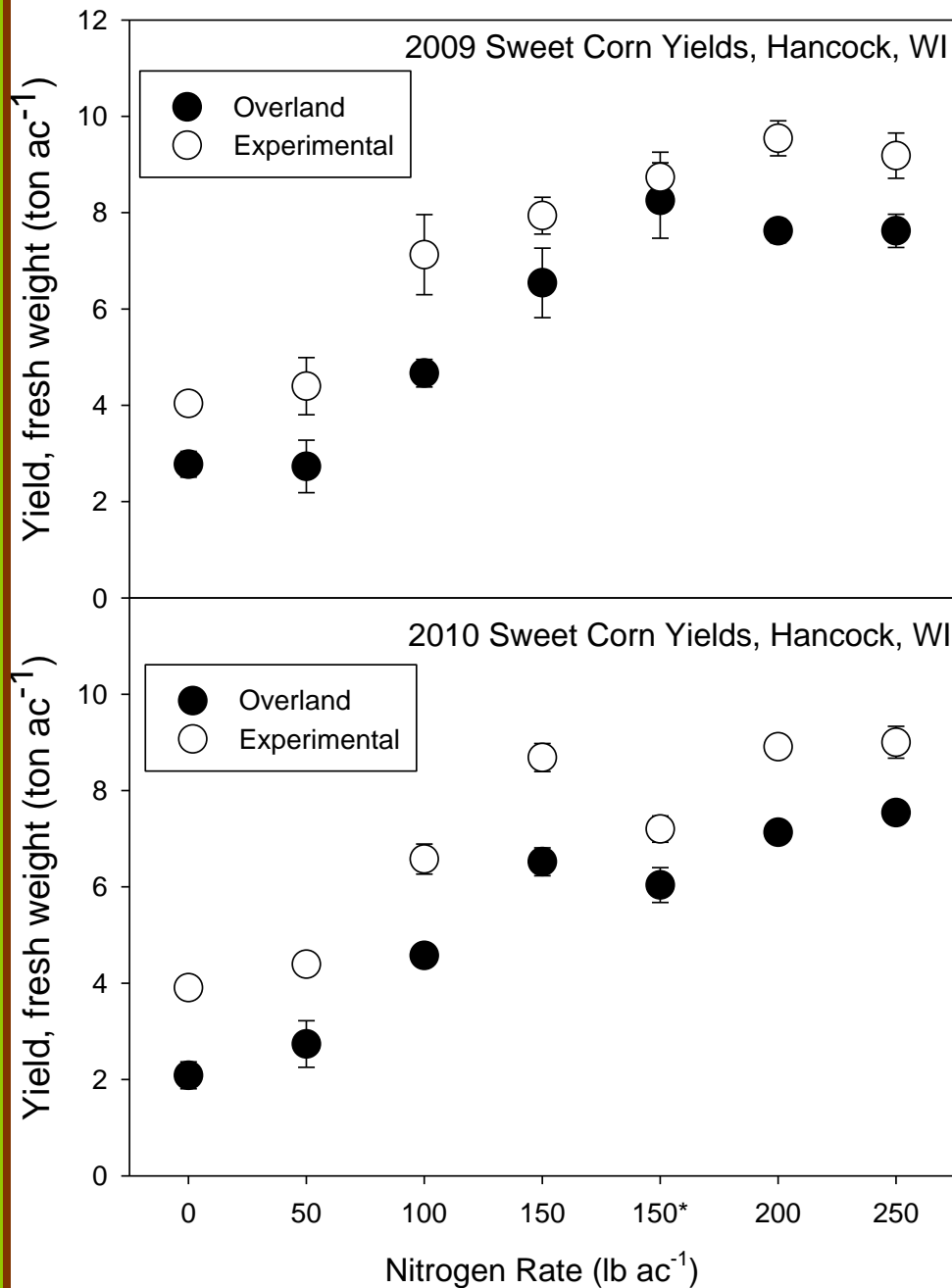
# N RATE (7) X VARIETY (2)

Objective:

- Determine the optimal N rate for conventional and new varieties.

Design:

- 0, 50, 100, 150 lb ac<sup>-1</sup> of N
  - 50 at V5, remaining at V8
- 150, 200, 250 lb ac<sup>-1</sup> of N
  - 50 at V5, variable at V8, 30 at tassel



**Yields maximized with 150 lb ac<sup>-1</sup> of N**  
**Two applications (2009),**  
**Three applications (2010)**

**The experimental variety exhibited greater yields at the same N rate and may need greater N rates to achieve maximum yield.**

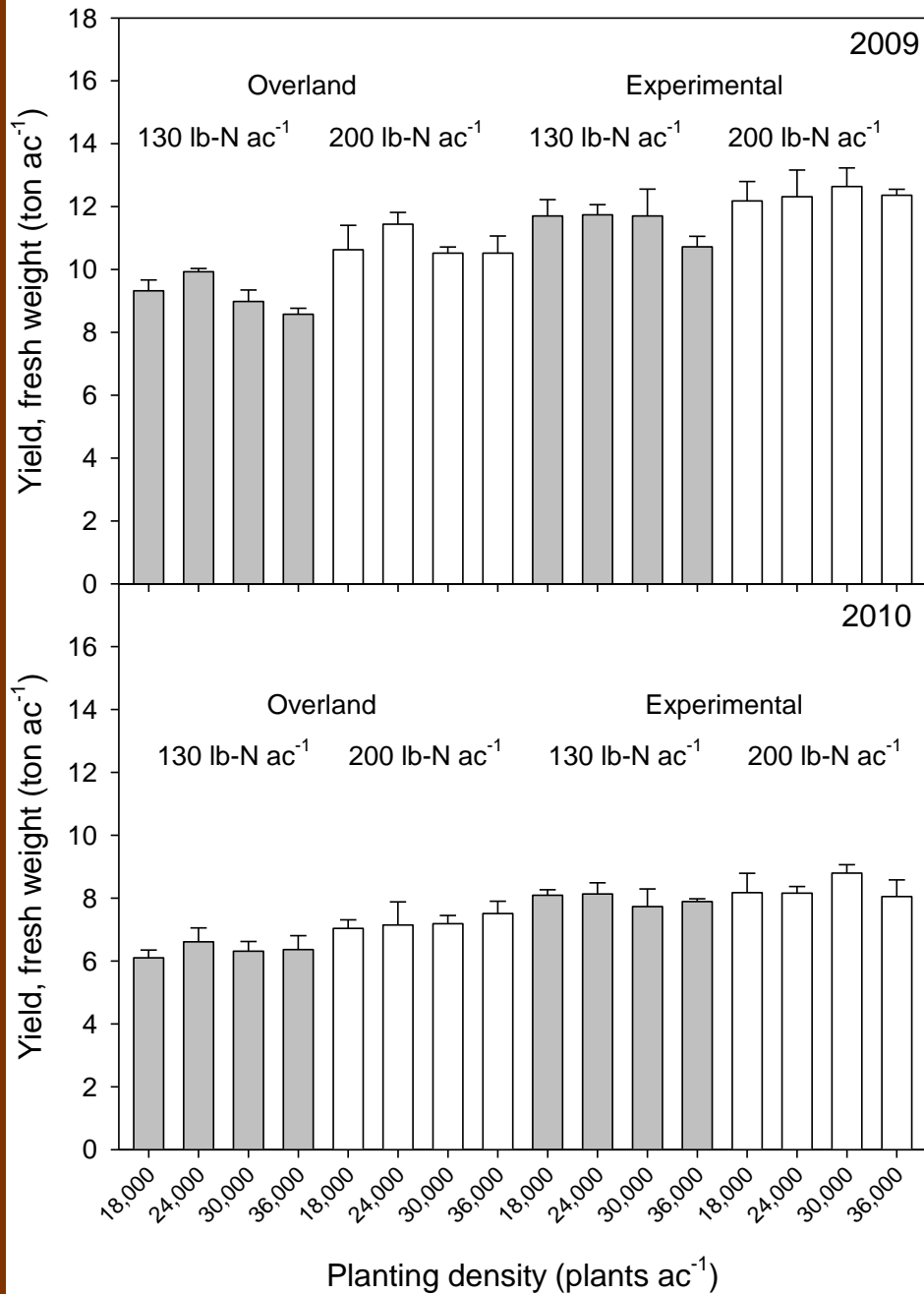
# DENSITY (4) X N RATE (2) X VARIETY (2)

Objective:

- Evaluate conventional and experimental varieties across seeding densities and N rates

Design:

- Densities: 18K, 24K, 30K, 36K seed  $\text{ac}^{-1}$
- N rate: 130 and 200  $\text{lb ac}^{-1}$



**No statistical effect of seeding density on yield in any year.**

**Trend of higher seeding rates decreasing yield.**

**Experimental variety may result in greater NUE with lower rates.**

# CONCLUSIONS

- Current research has not shown an increase in need for N on sweet corn.
- But, as always with a high value crop, grower will take the risk of greater N.
- On sandy soils, if applying rates greater than 150 lb ac<sup>-1</sup>, use split applications.

# FUTURE RESEARCH

- Future research will focus on optimal split applications, controlled-release fertilizers and utilizing in-season plant diagnostic tests to optimize fertigation.

QUESTIONS?  
COMMENTS?  
CONCERNS?  
COMPLAINTS?