DEPARTMENT OF SOIL SCIENCE
University of Wisconsin-Madison

COVER CROP RESEARCH UPDATE:

RYE AND RADISH EFFECTS ON SOIL NITROGEN

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RADISH AFTER WINTER WHEAT + MANURE

WASHINGTON COUNTY, WI

- **Determine if there is a nitrogen credit for radish**
- Following winter wheat harvest and 4,800 gal/ac of liquid dairy manure (worked in with turbo till).
  - ~30 lb-N/ac manure credit
- Radish planted in 30’ strips (radish winterkills)
- 6 strips of radish, 3 strips no radish, 3 strips no radish with tillage
- Corn planted in 2012 with six N rates
  - 0, 100, 125, 150, 175, 200 lb-N/ac

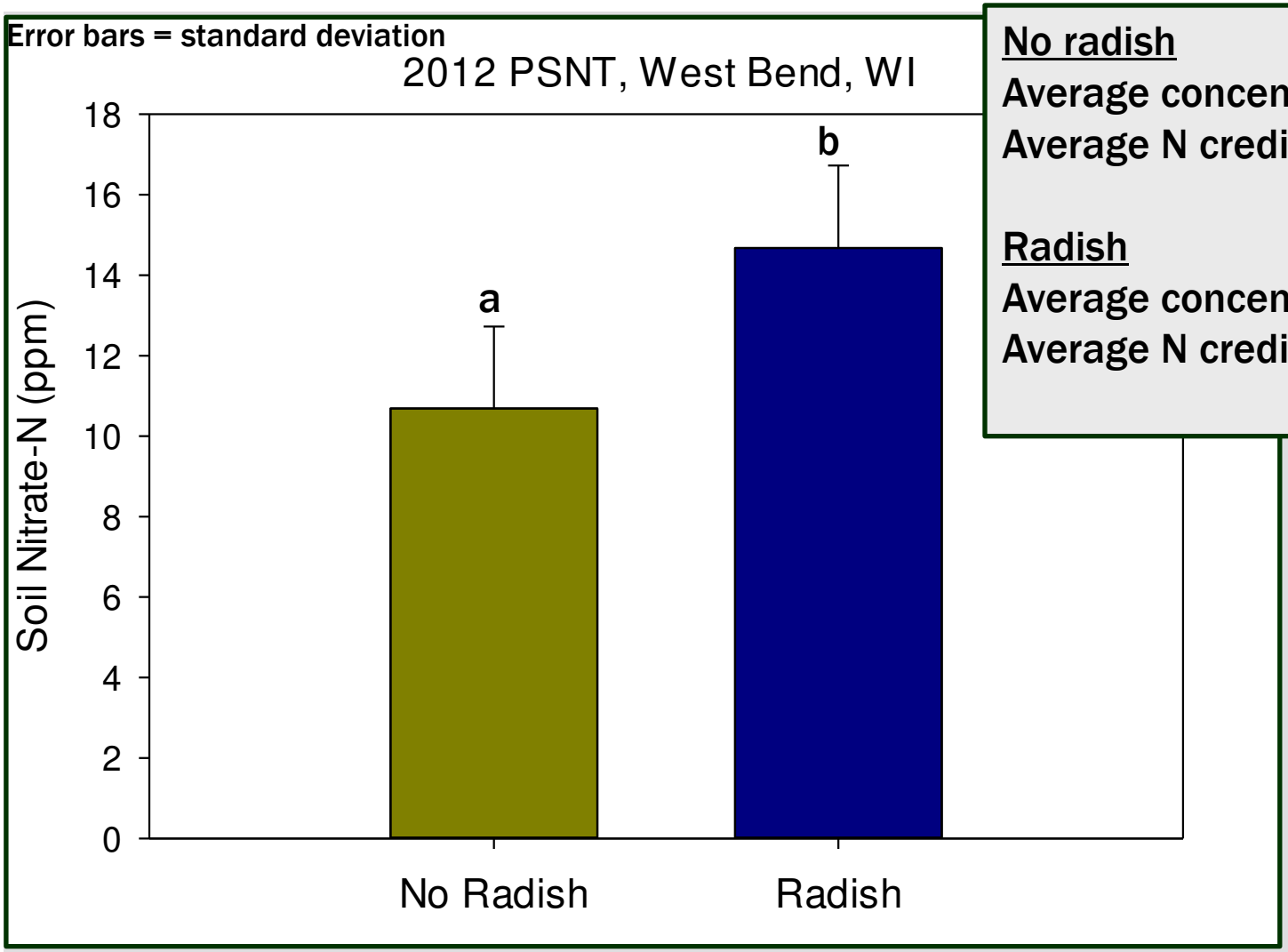

October 4, 2011


October 4, 2011


April 11, 2012


April 11, 2012

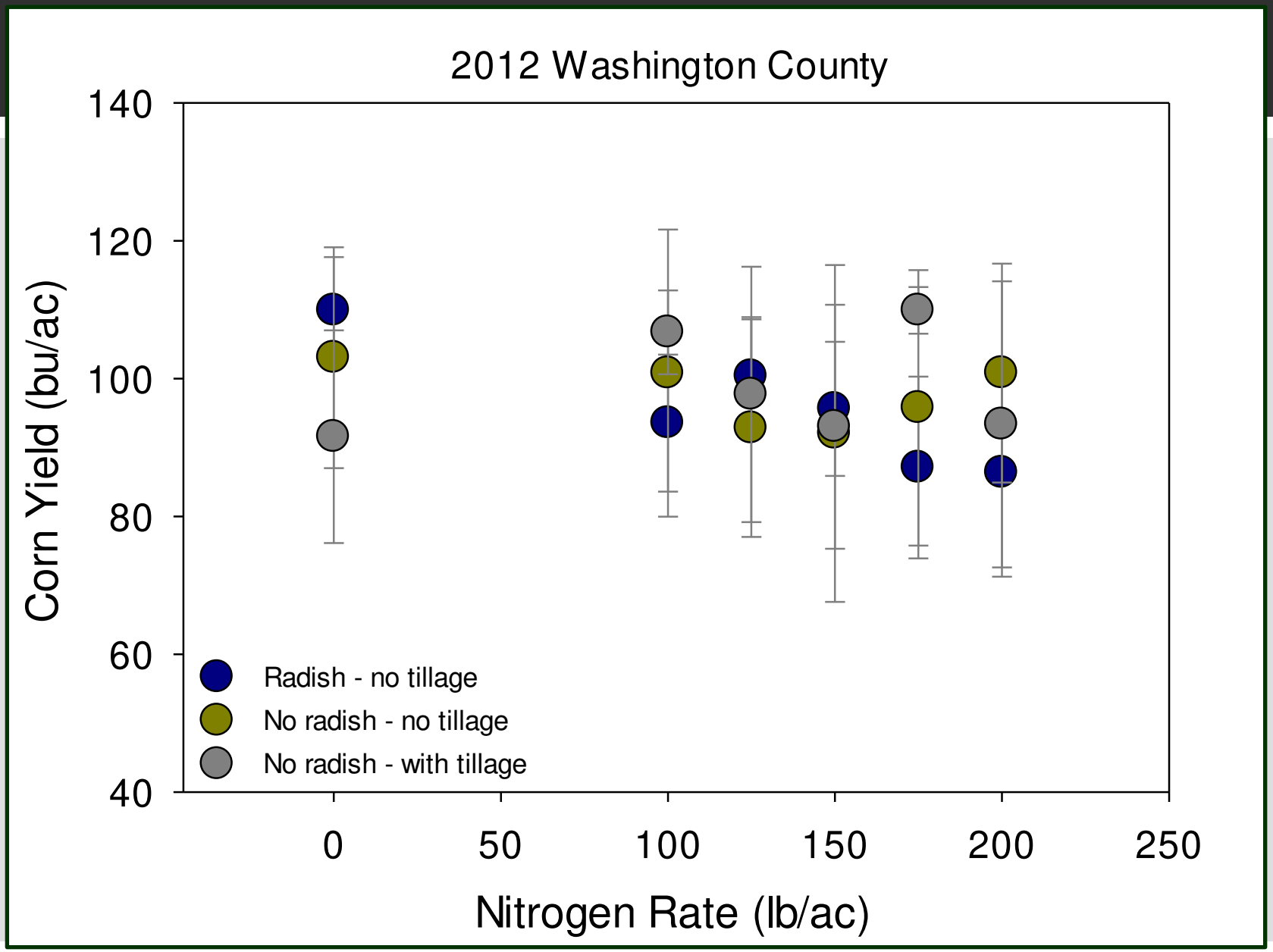
PSNT – WASHINGTON COUNTY



No radish
Average concentration: 11 ppm
Average N credit: 10 lb/ac

Radish
Average concentration: 15 ppm
Average N credit: 60 lb/ac

2012 CORN YIELDS



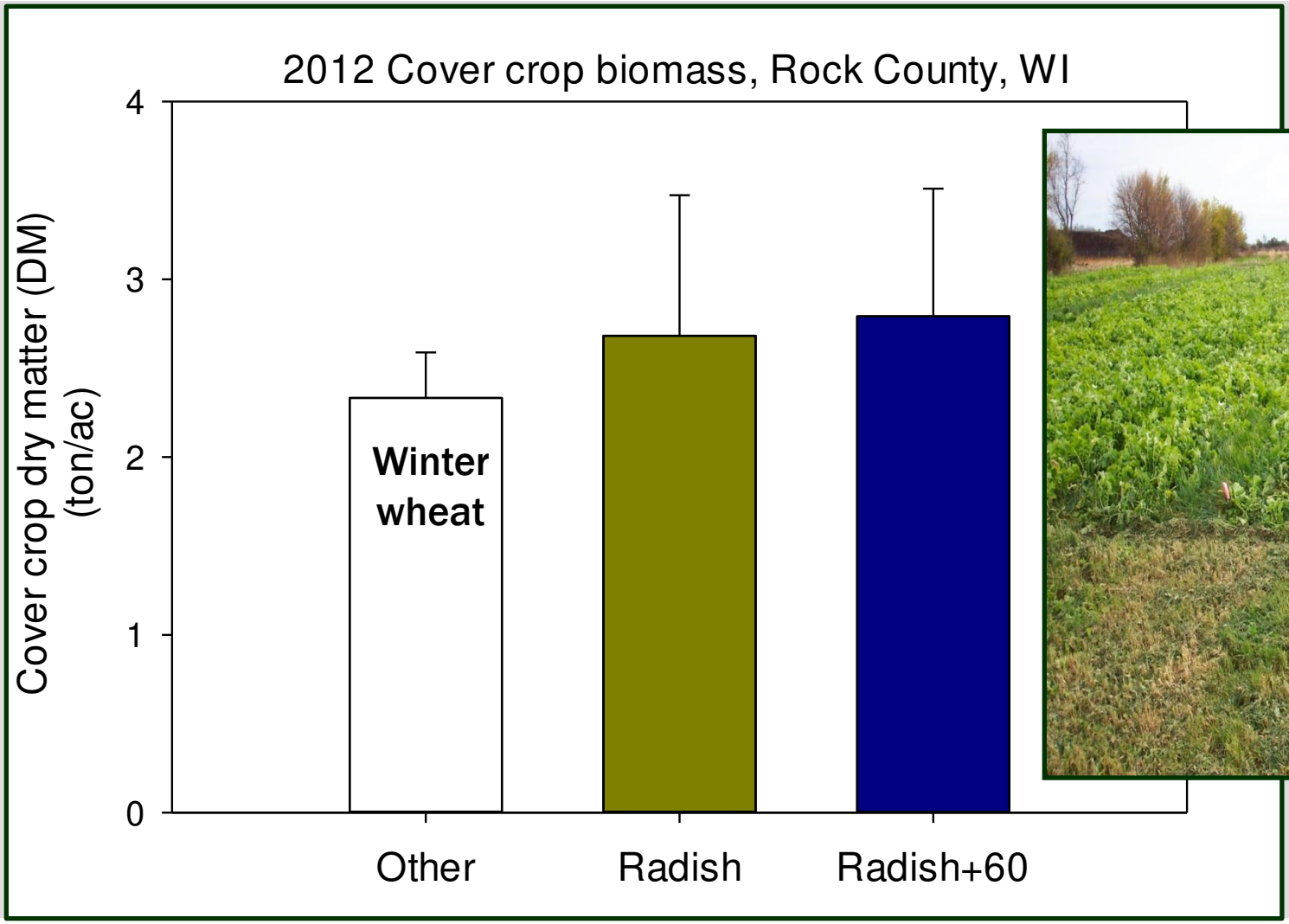
RADISH AFTER WINTER WHEAT – NO MANURE

RADISH – ROCK CO.

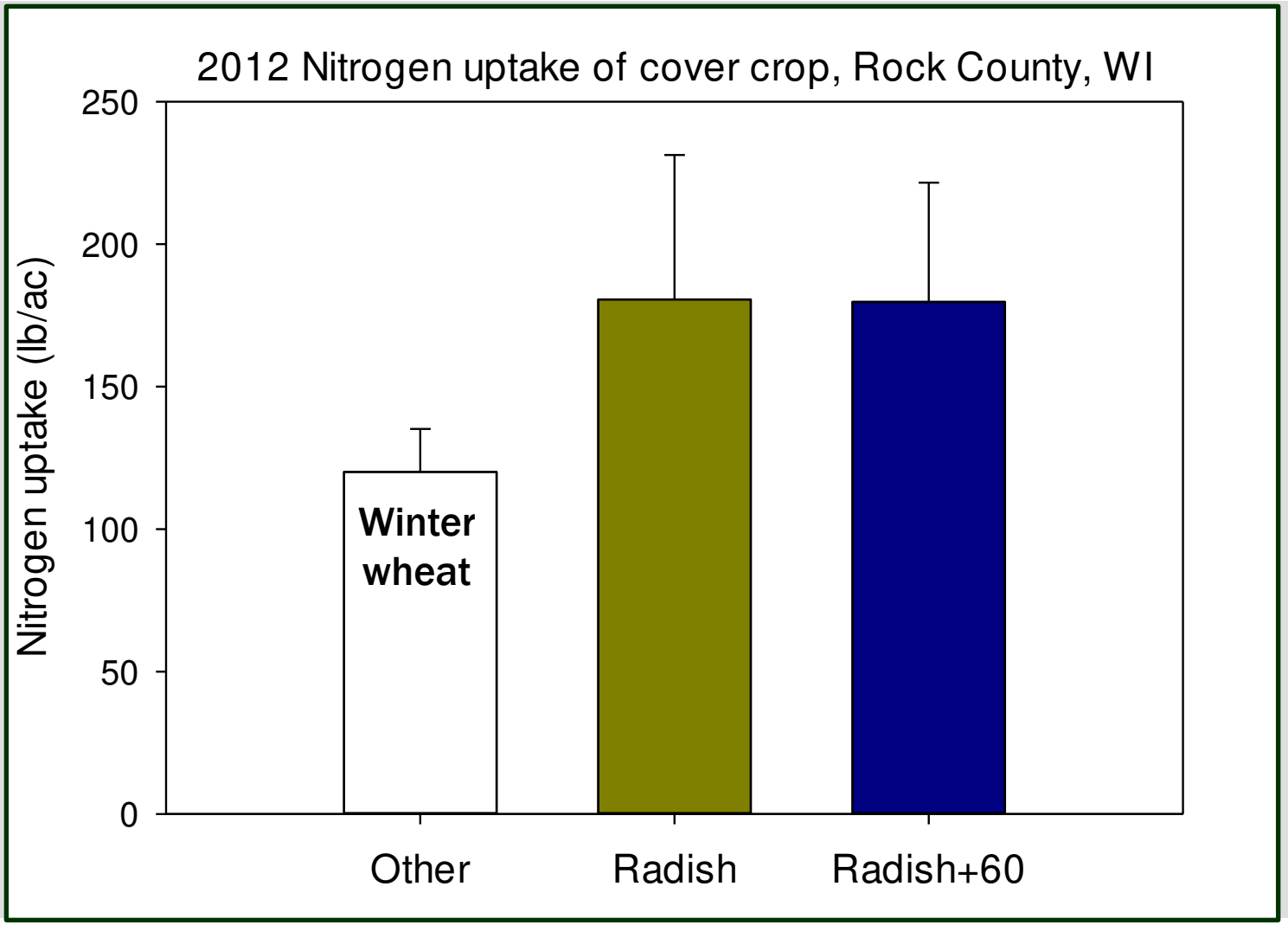
What is the effect of radish corn yield and optimum N rate

- Three cover crop treatments: None, Radish, & Radish + 60 lb-N/ac
- Radish seeded at 10 lb/ac
- Six N rates on corn: 0, 40, 80, 120, 160, 200 lb-N/ac

RADISH STUDY – ROCK CO.

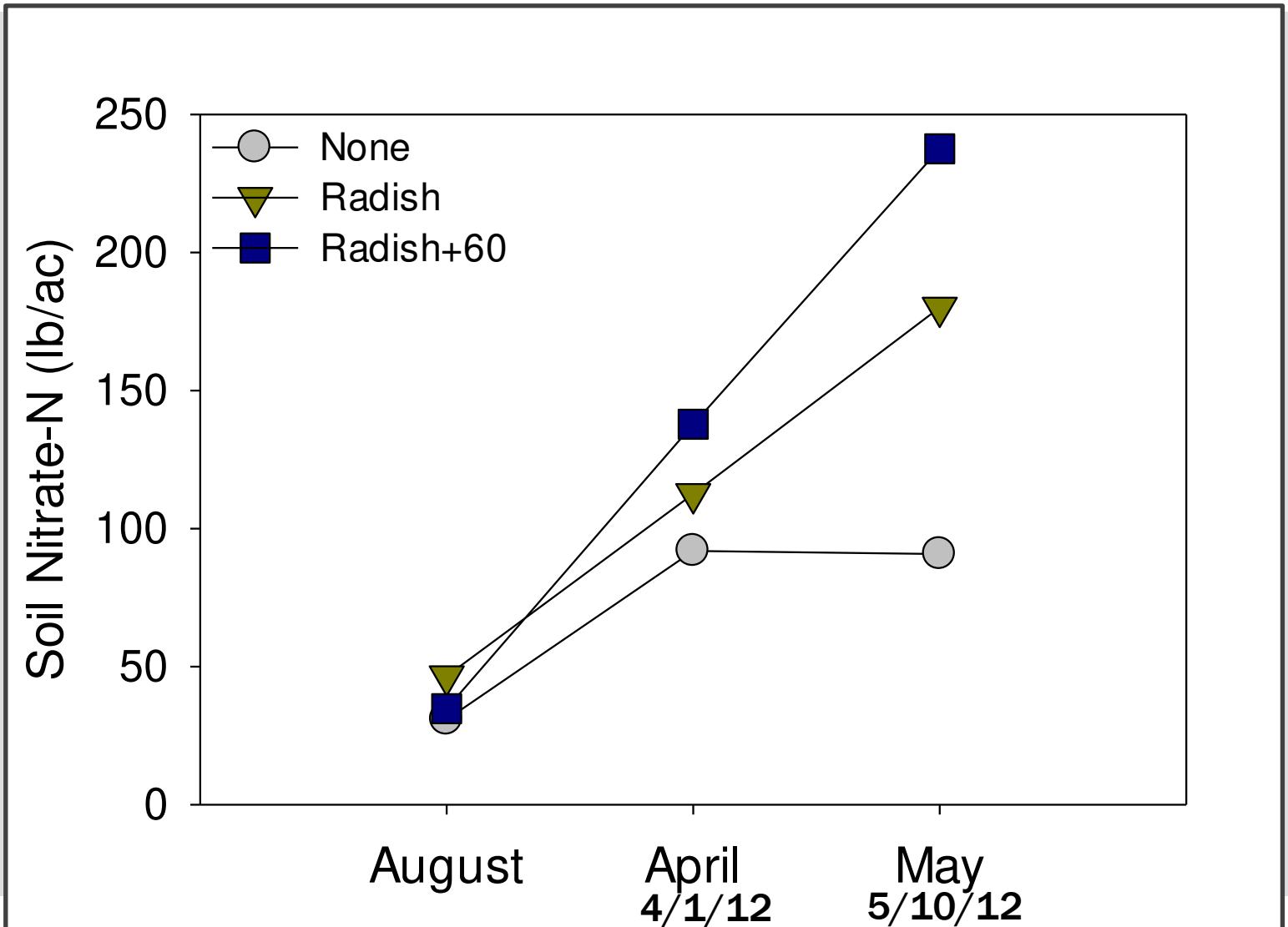


RADISH STUDY – ROCK CO.

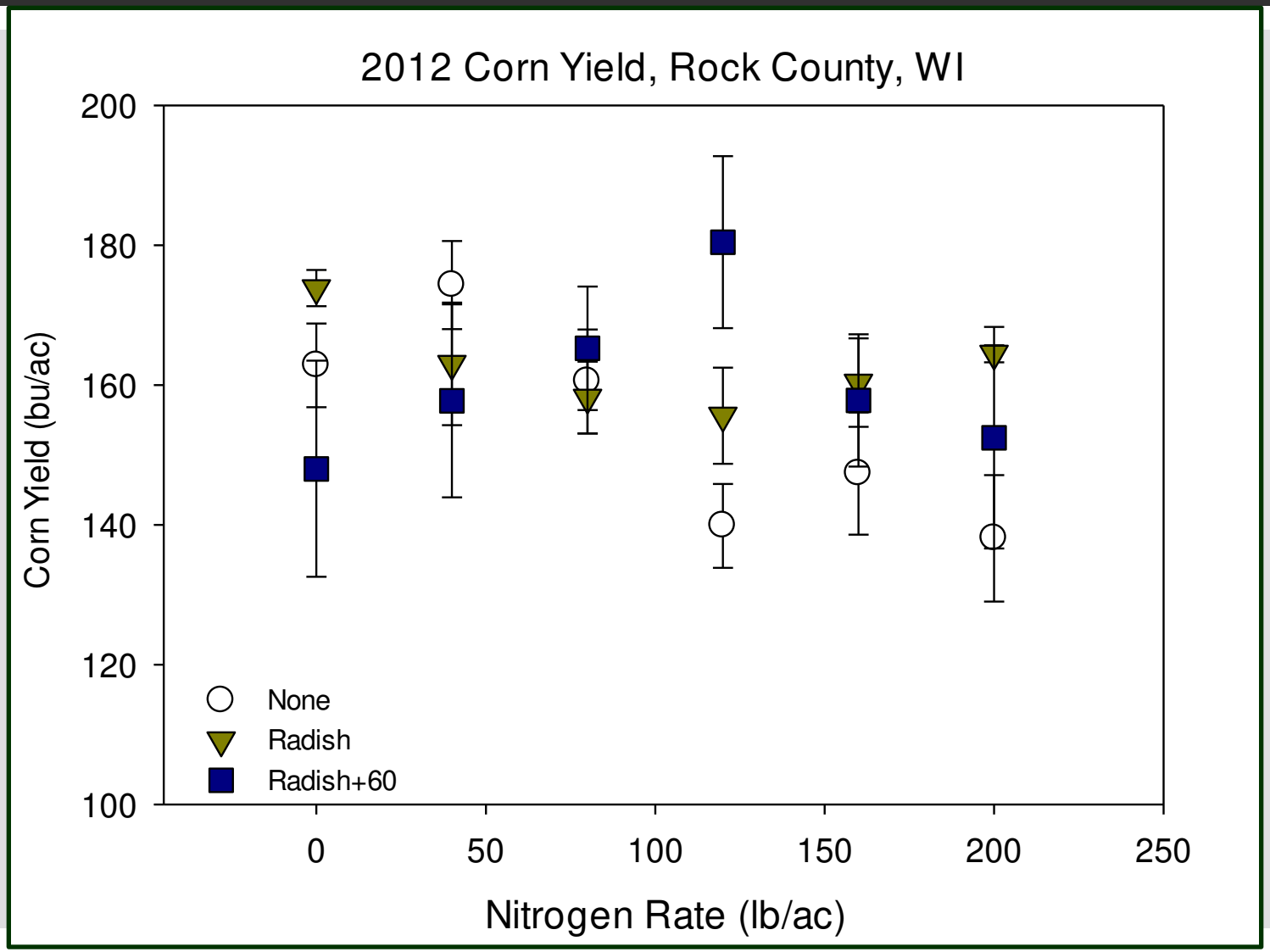


SOIL NITRATE-N

Soil nitrate-N concentrations increased from fall to spring, with radish plots also having an increase in soil nitrate-N between April and May.



RADISH STUDY #1 - YIELDS



CONCLUSIONS & FUTURE CONSIDERATIONS

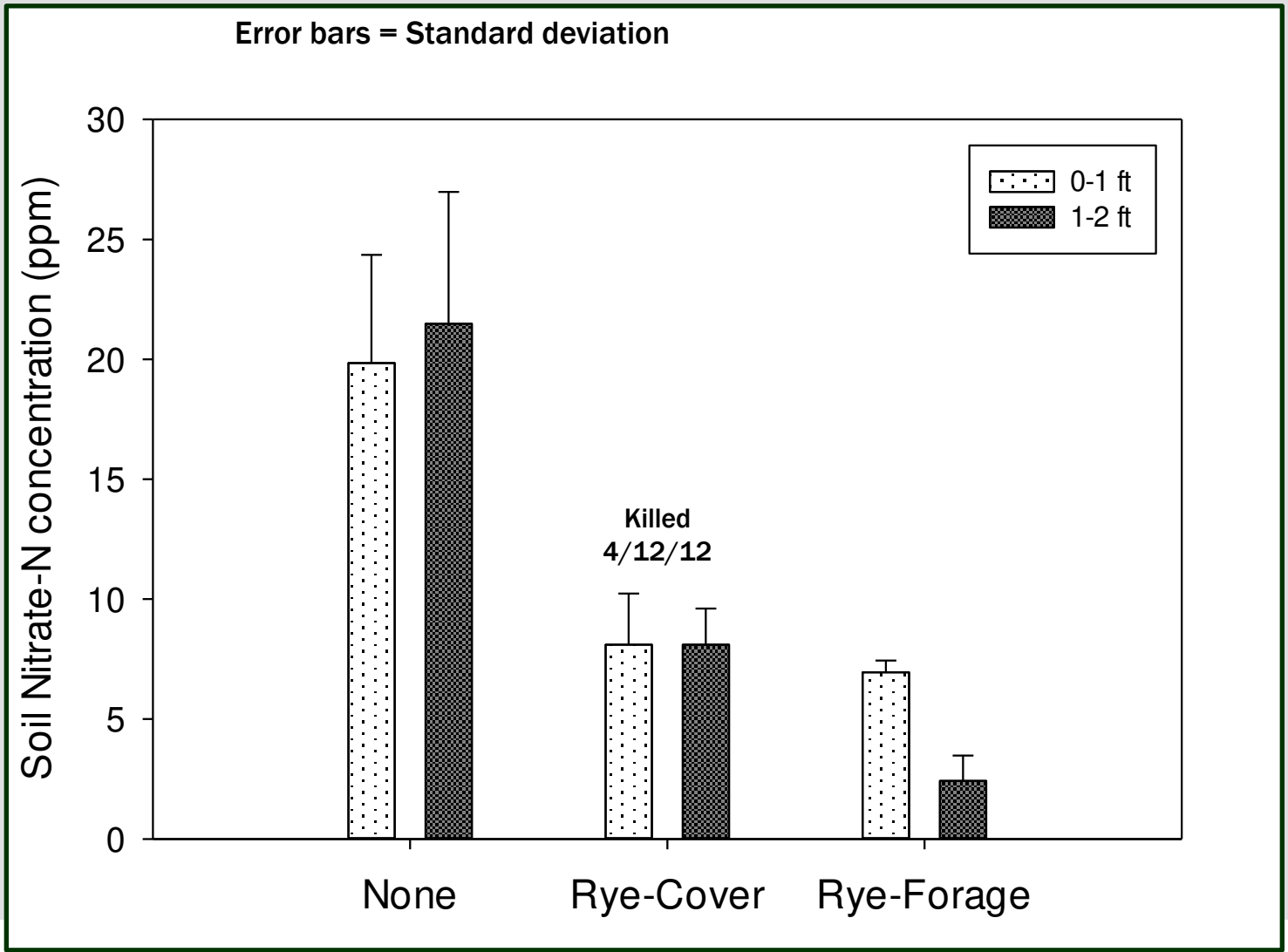
- Radish affected the PPNT & PSNT value, but not response to N
- Lack of response to N – effect of drought (?)
- New trials have begun with same cooperating growers.
- Research supported by the Wisconsin Fertilizer Research Council & Soil Science Leo Walsh Fellowship

WINTER RYE AFTER CORN SILAGE

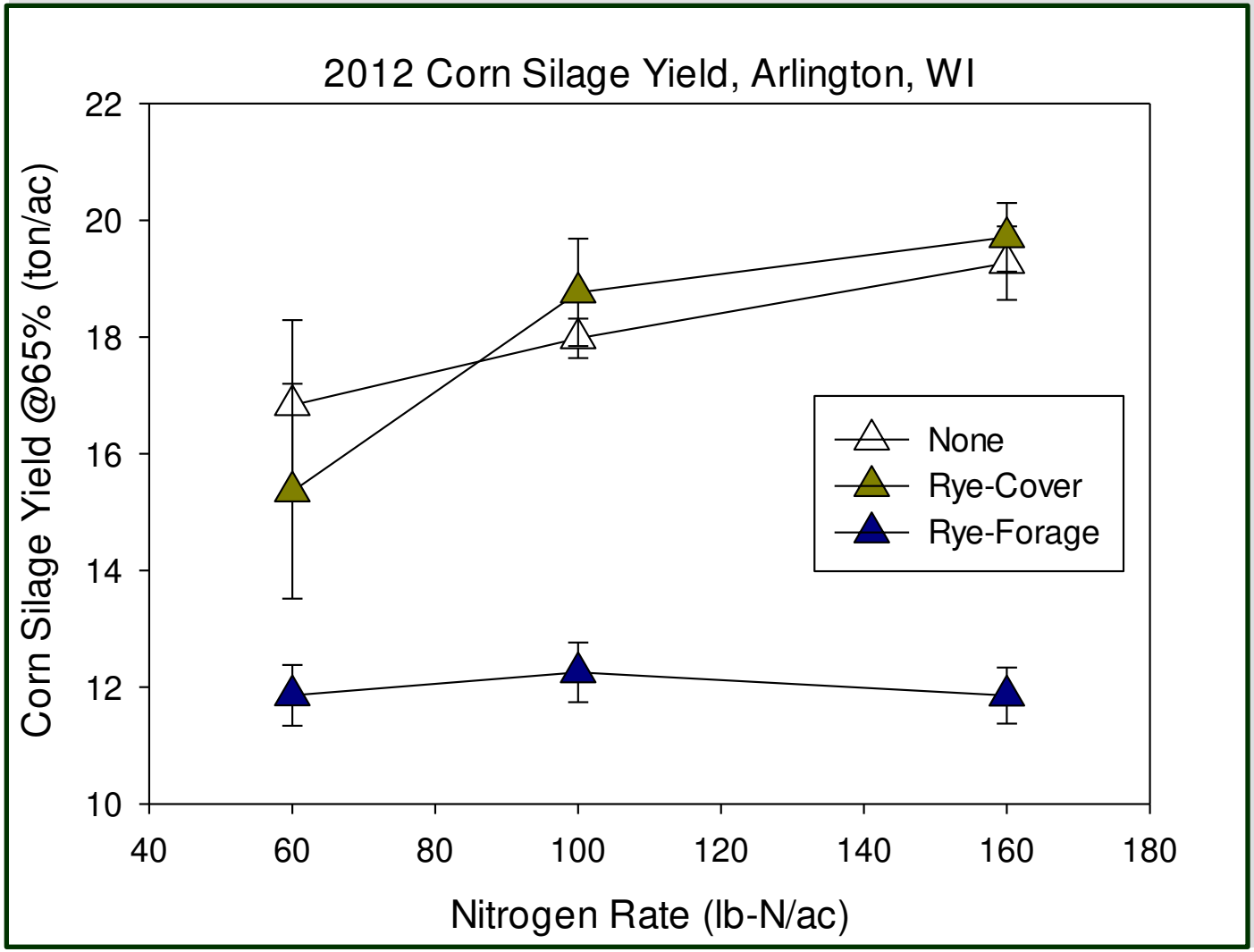
June 29, 2012

June 29, 2012

2012 PPNT (4/30/12)



CORN SILAGE YIELD



Optimal yields did not occur with lower N rates (utilization of rye did not make manure N more available – but it did not make it less available either).

Trying to get another forage crop was a net zero sum game. Rye forage yielded 2.5 ton DM (7.1 ton/ac yield @65%).

QUESTIONS?
COMMENTS?
CONCERNS?

EXPERIMENTAL DESIGN

- 2011: No-till corn silage, after harvest (9/9/11) we applied 9,700 lb/ac of liquid dairy manure (9/23/11) (64 lb/ac of available N).
- 2011: Three systems: no cover crop, winter rye cover crop, or winter rye forage crop.
  - Rye planted at 140 lb/ac (3/4” depth) (10/5/11)
- 2012: PPNT & PSNT, sidedress application of 60, 100, or 160 lb/ac of N as ammonium nitrate. (6/5/12)

EXPERIMENTAL DESIGN

- 160 lb/ac represents if there is no manure-N credit (i.e. the rye made manure-N less available).
- 100 lb/ac represents the recommended N rate w/ the recommended manure-N credit.
- 60 lb/ac represents a reduction in the recommended rate (i.e. the rye made the manure-N more available).

N IN SOIL VS. N IN PLANT

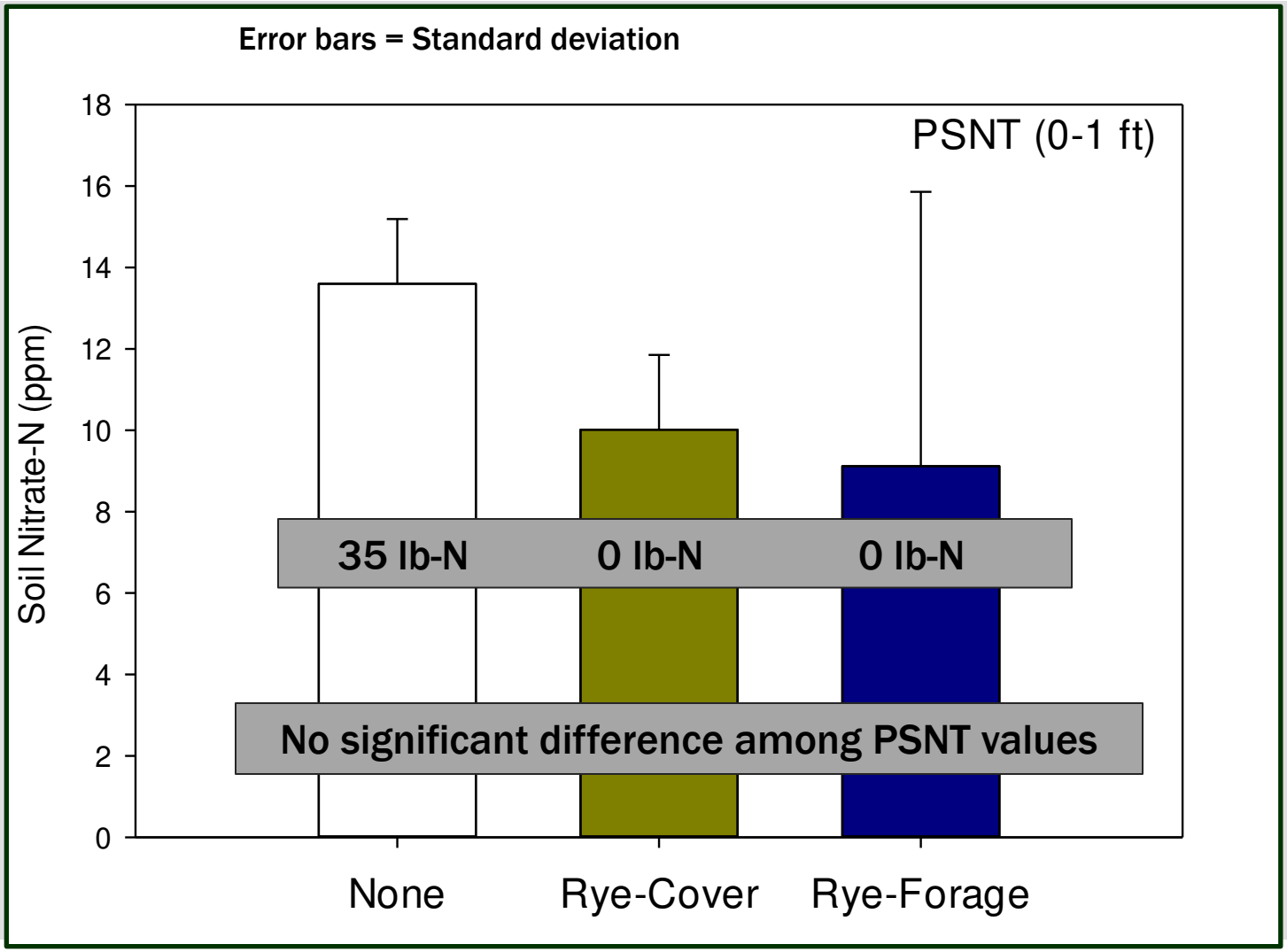
Treatment	Total N applied in fall	Available N applied in fall	Nitrate-N in 2' of soil @ planting	N uptake of rye (AGB)
	lb/ac			
None	136	64	165	–
Rye - Cover 1.5 ton/ac	136	64	65	115
Rye - Forage 2.5 ton/ac	136	64	38	125

Rye cover = 3.5% N; Rye forage = 2.5% N


Rye as cover crop
No cover crop


Rye as forage crop
Rye as cover crop

2012 PSNT (6/5/12)



- Large amount of variation in PSNT.
- Too variable to know if there is a real difference in PSNT values.

FUTURE CONSIDERATIONS

- Rye, when seeded after fall manure application, changes soil nitrate concentrations – this could impact the interpretation of the PSNT.
- We will evaluate this for multiple years to investigate year-to-year effects.
- We will interpret corn silage quality analysis to look at total silage quality, not just quantity.

RADISH STUDY #1 & #2