

Soybean's Element of Surprise: Sulfur?

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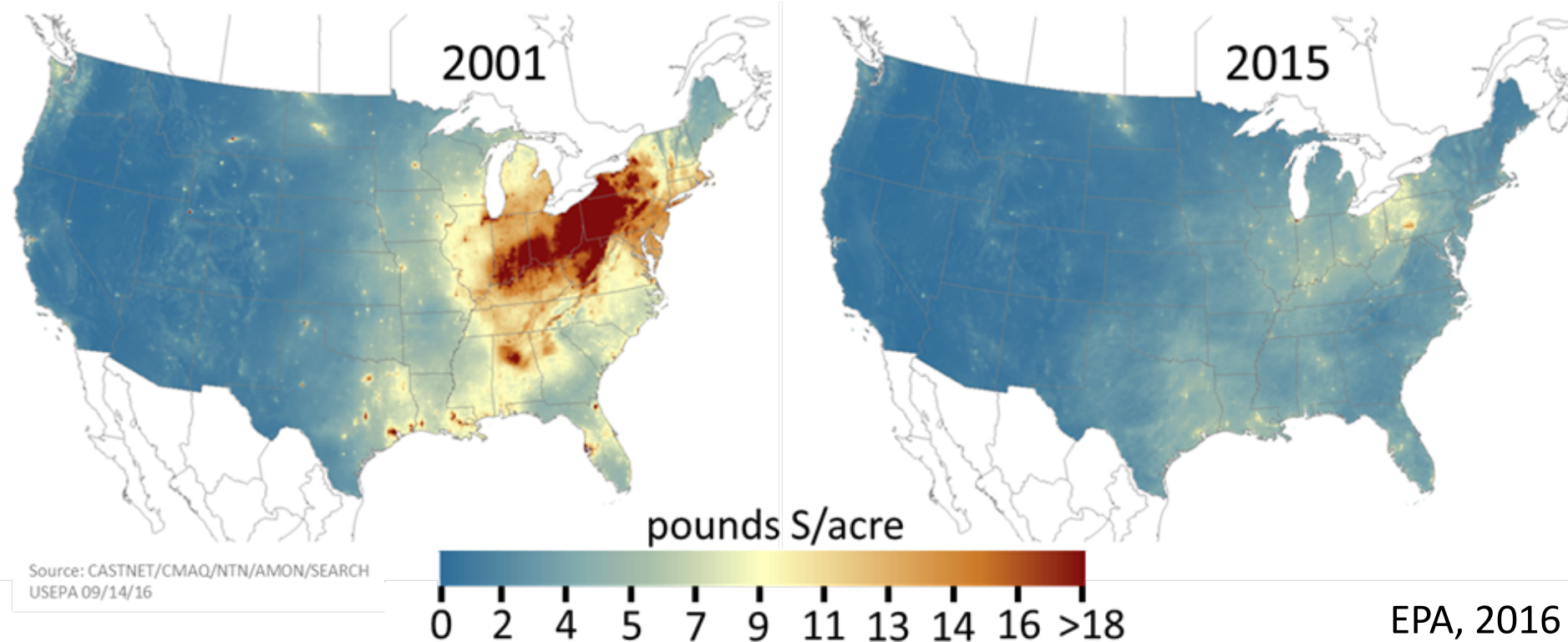
SOYBEAN STATION

DELIVERING FIRST CLASS SOYBEAN INFORMATION



Sulfur: Who Needs It...Maybe You?

Total deposition of sulfur



Which Indiana Crops Should Be the Most Responsive to Sulfur?

How Much S Does Soybean Need?

Grain	lb/bu	50 bu	75 bu	100 bu
Nitrogen	3.30	165	248	330
P ₂ O ₅	0.73	37	55	73
K ₂ O	1.20	60	90	120
Sulfur	0.18	9	14	18
Total S	0.35	18	26	



1923



1943



1964



2011

Early Growth (aka Vegetative Stages) Leaf Nutrient Sufficiency Ranges

N	P	K	Ca	Mg
3.5 to 5.5	0.30 to 0.60	1.7 to 2.5	1.1 to 2.2	0.03 to 0.60

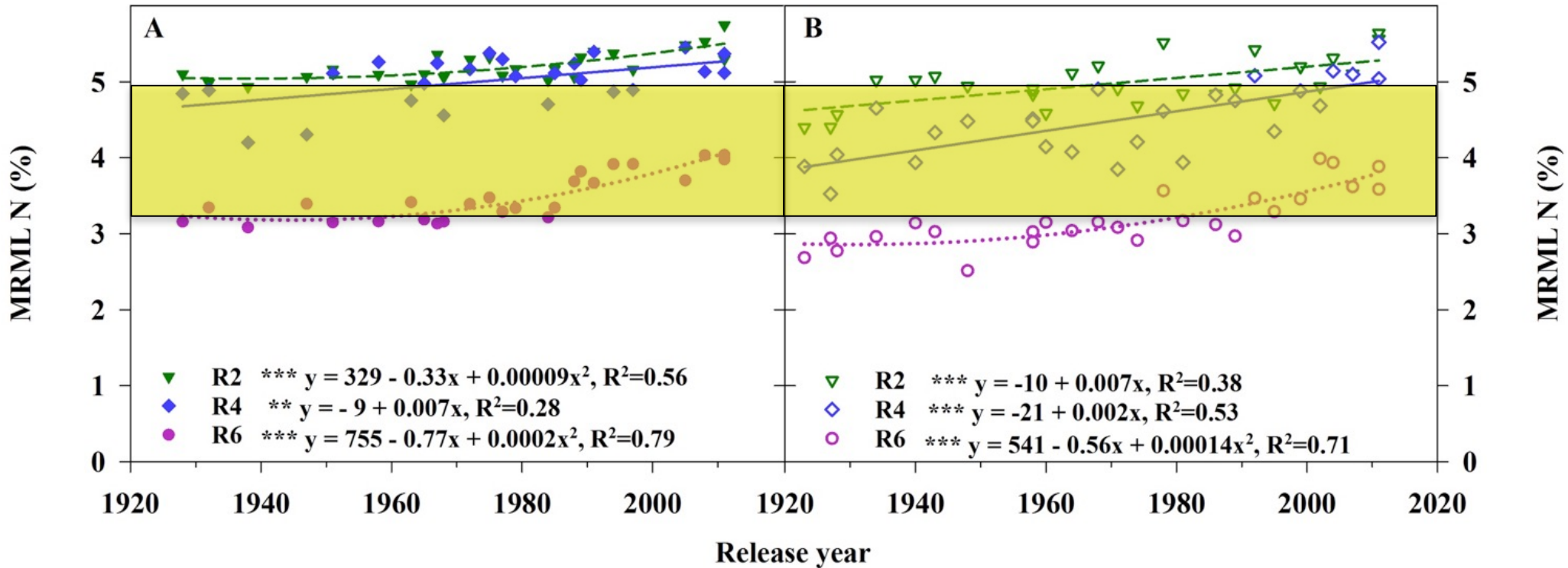
Flowering (aka R2) Leaf Nutrient Sufficiency Ranges

N	P	K	Ca	Mg
3.25 to 5.0	0.30 to 0.60	1.5 to 2.25	0.8 to 1.4	0.25 to 0.70
S	Manganese	Zinc	Copper	Boron
0.25 to 0.60	17 to 100	21 to 80	4 to 30	20 to 60

Leaf Nitrogen @ R2, R4, R6

MG 2

MG 3

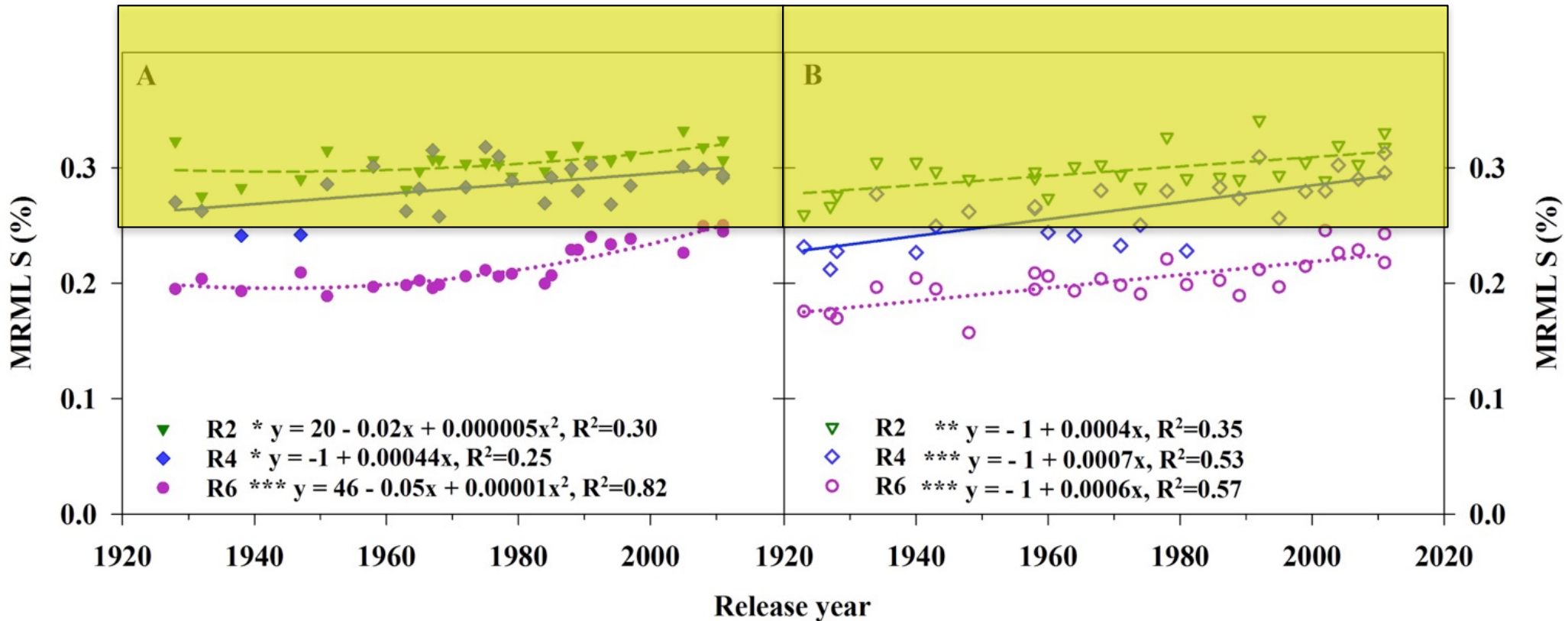


R2 Sufficiency = 3.25 to 5.0% N

Leaf Sulfur @ R2, R4, R6

MG 2

MG 3



R2 Sufficiency = 0.25 to 0.60% S

Preliminary Results of Soybean Response to Sulfur





Rice Rescue: July 2, 2015



Rice Happy: July 2, 2015

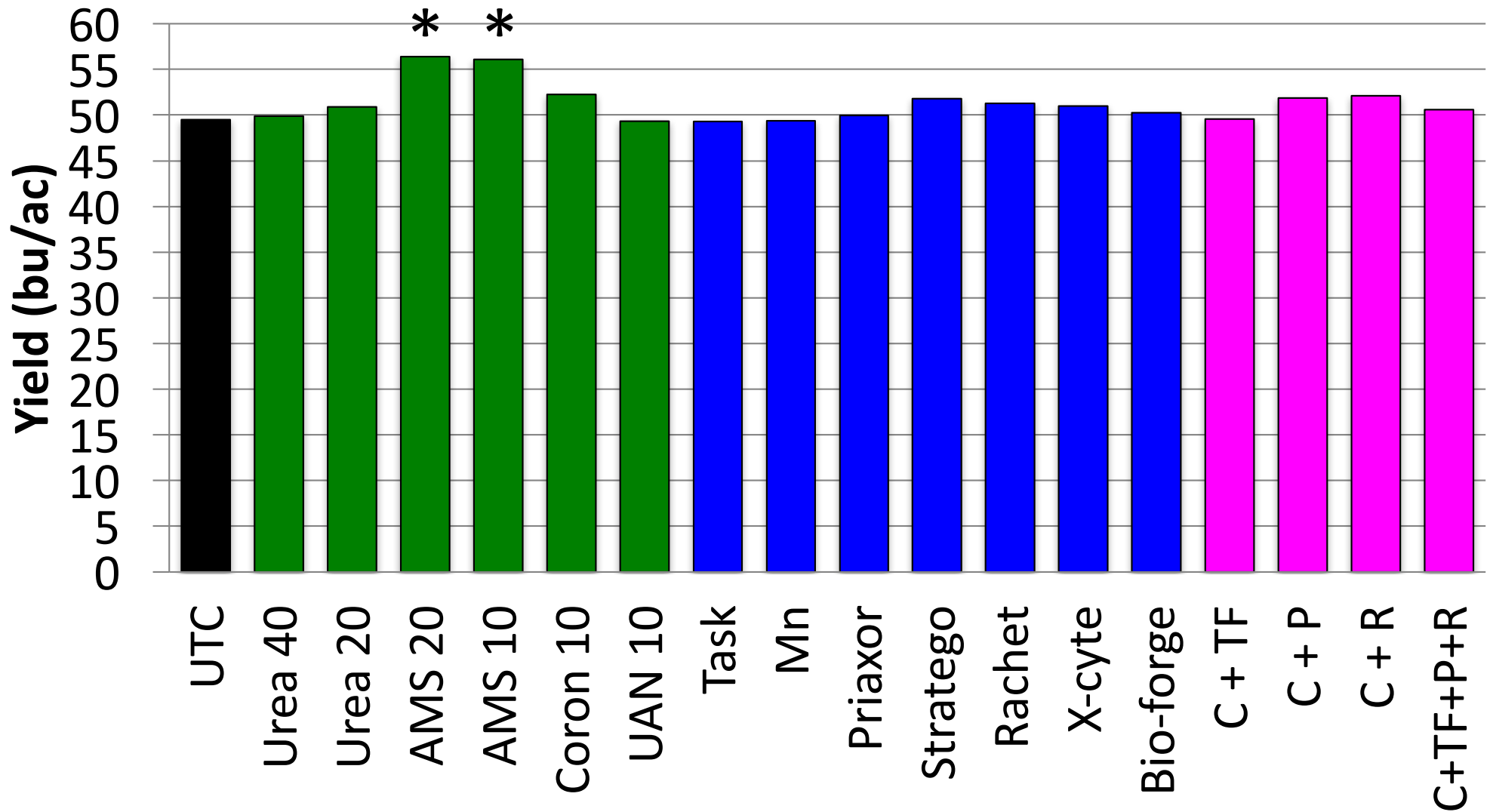
Rice Rescue: Aug 3, 2015



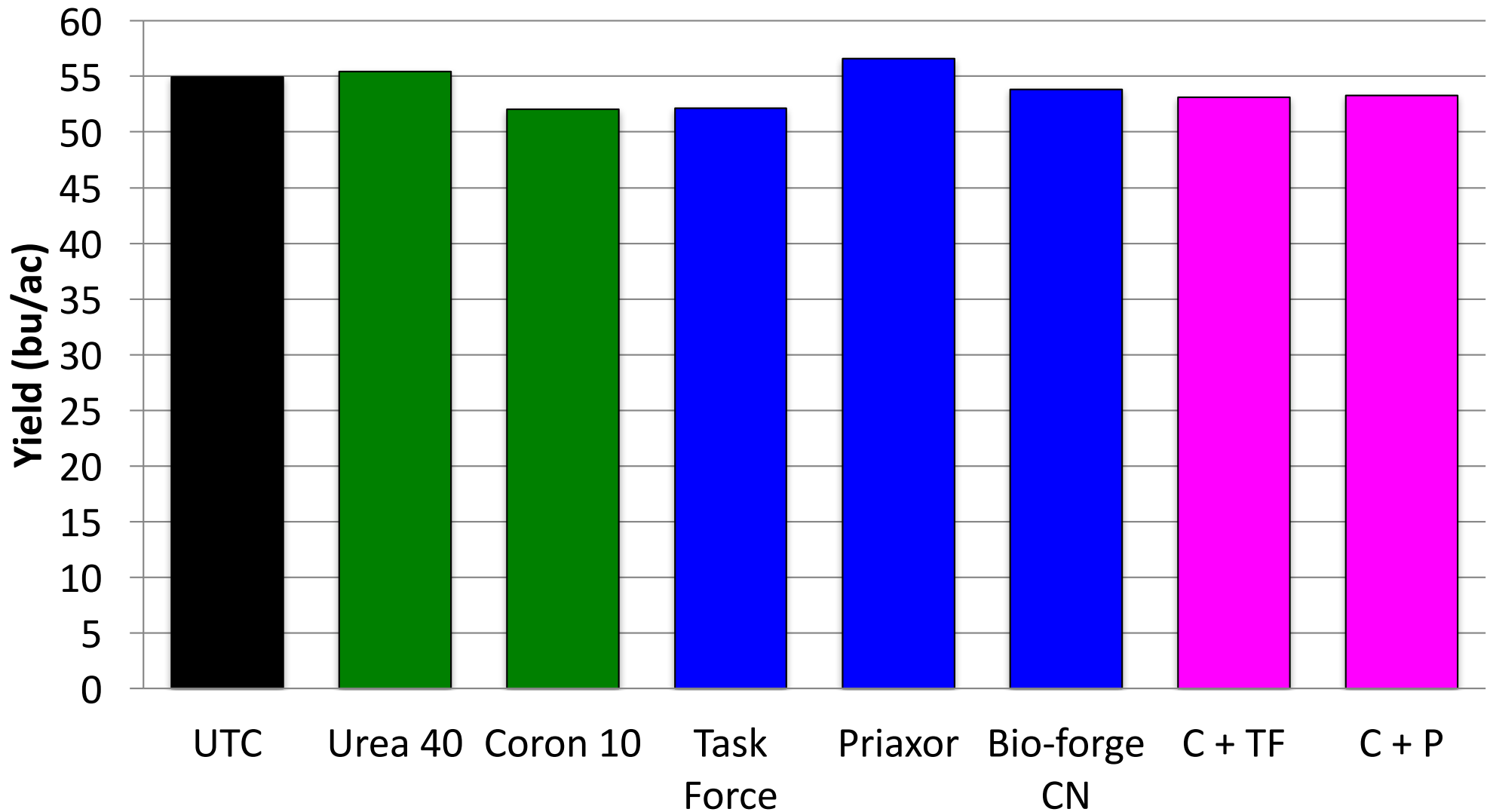
AMS @ 20 lb N/ac

Urea @ 40 lb N/ac

Rice RESCUE Yields



Rice Happy Yields



Sulfur Studies at LaCrosse in 2016



Sulfur Season Treatments

- **Untreated**
- **Broadcast @ 20 lb S/ac with MES10 or AMS**
- **Single foliar @ 5 lb S/ac at:**
 - **V4, R2, R4, R6**
- **Sequential foliar combos @ 5 lb S/ac per pass**
 - **V4 + R2**
 - **V4 + R4**
 - **R4 + R6**
 - **V4 + R2 + R4 + R6**

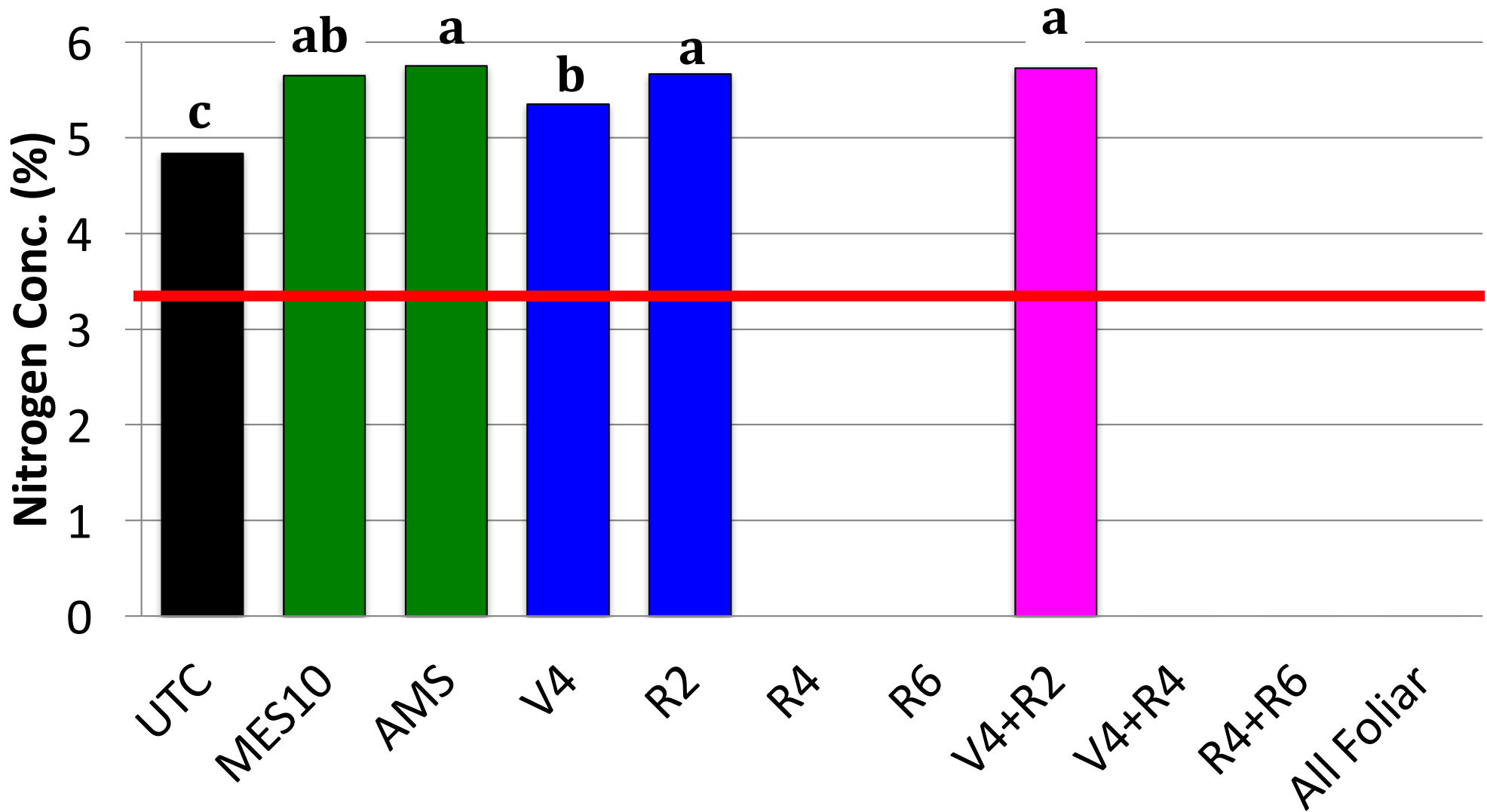
No Sulfur



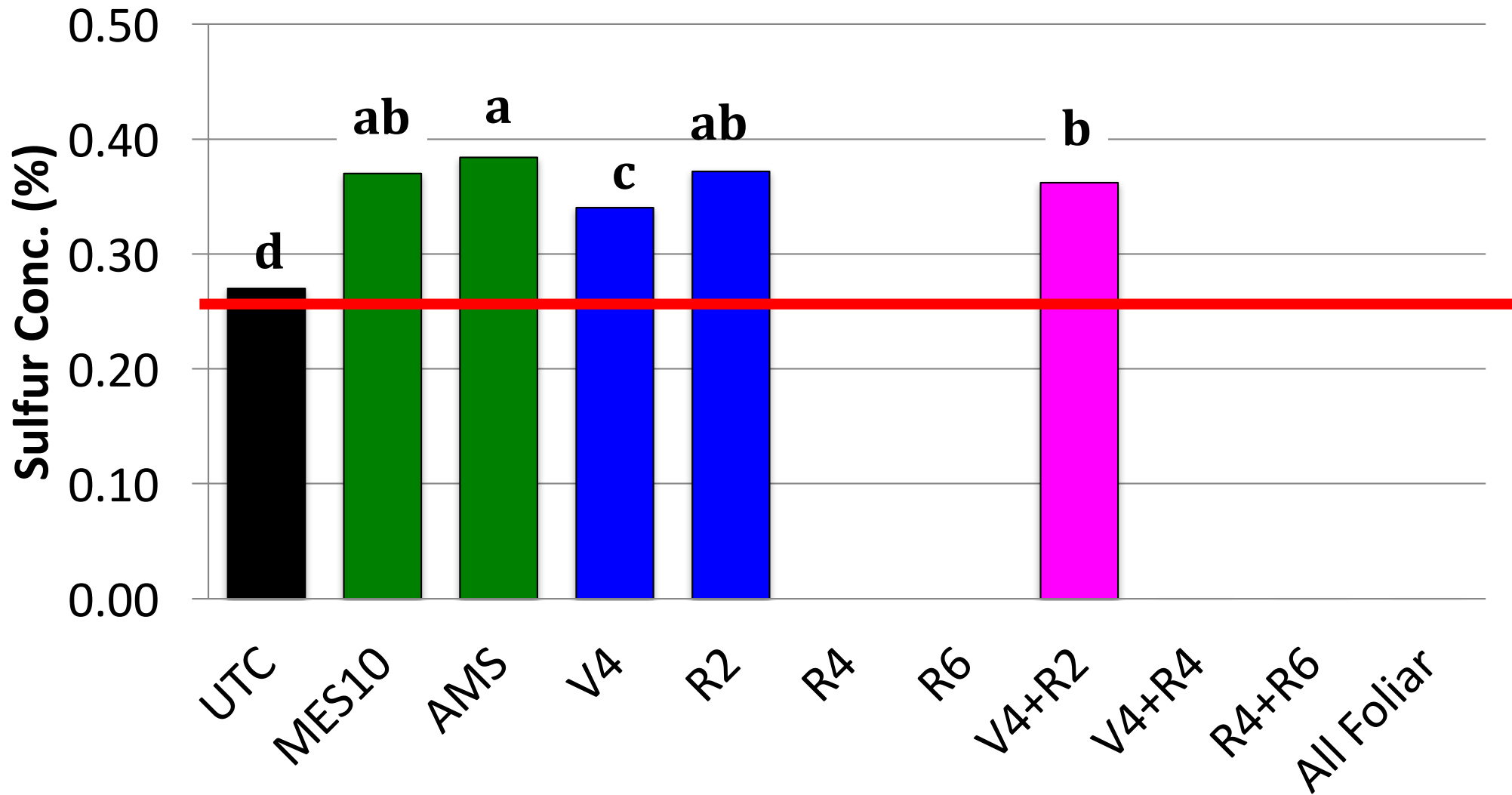
20 lb S/acre



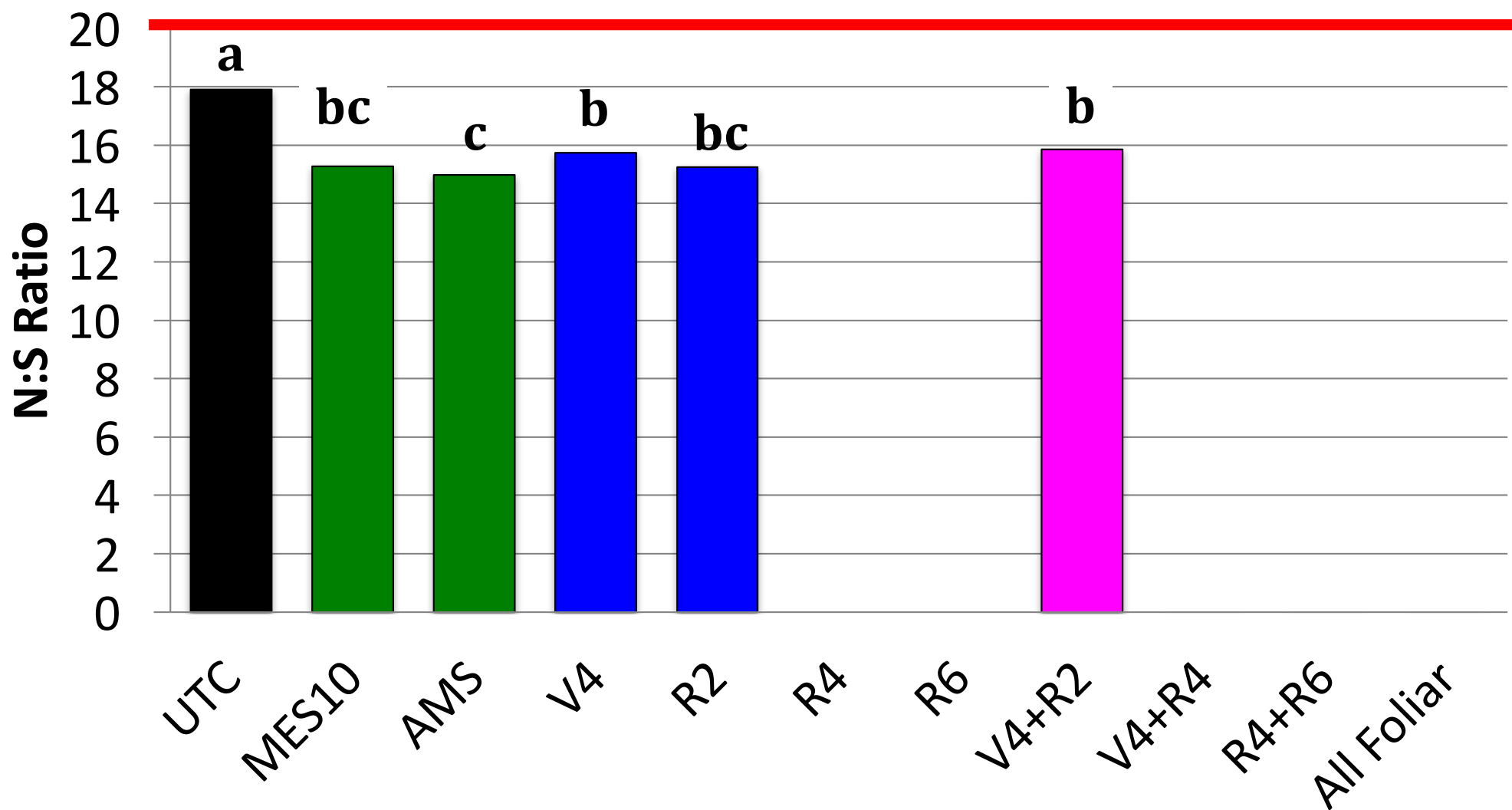
2016 Nitrogen @ R3 (18 d after R2)



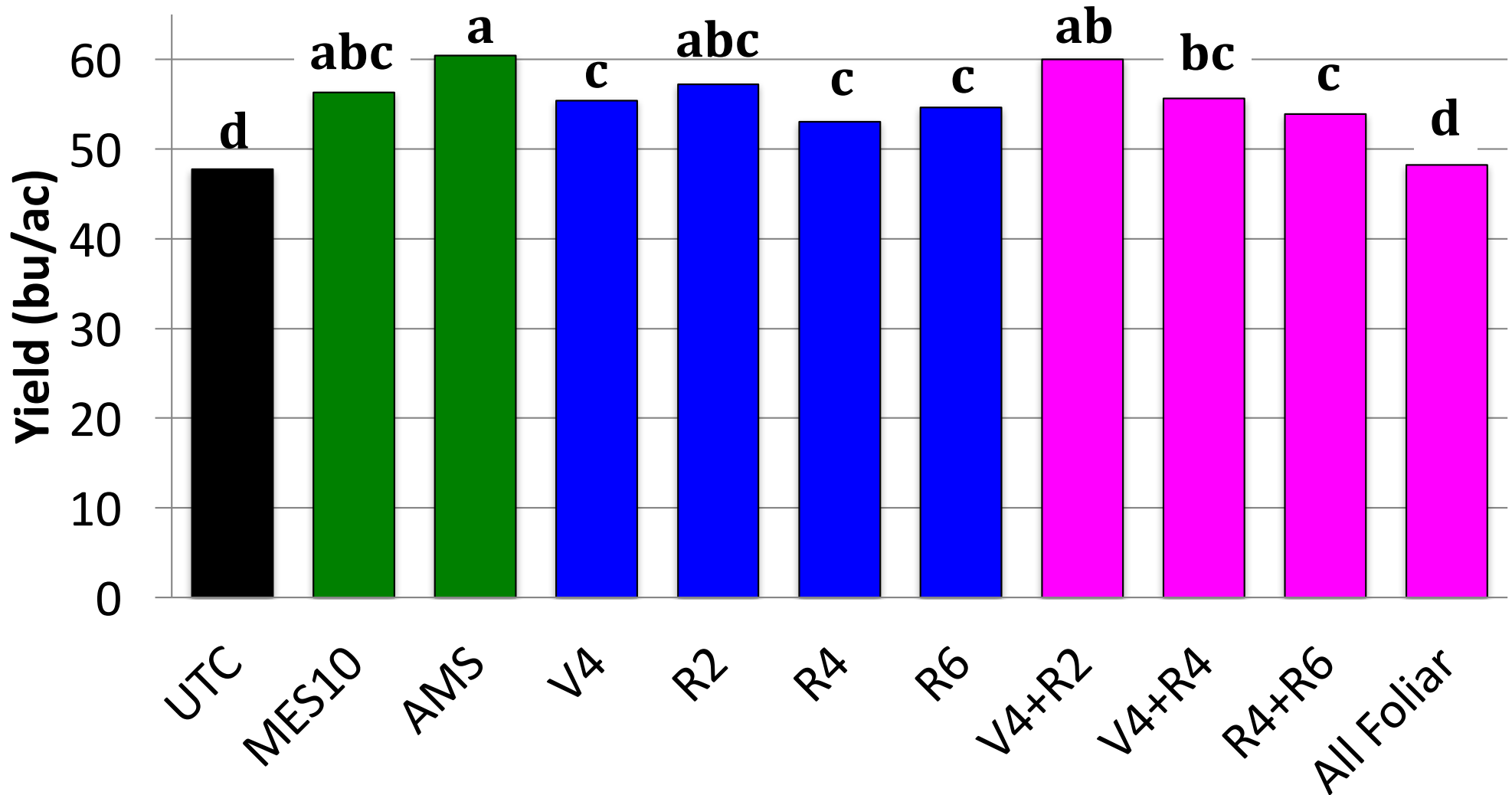
2016 Sulfur @ R3 (18 d after R2)



2016 N:S @ R3 (18 d after R2)



2016 Sulfur Season @ LaCrosse



2016 Sulfur Responsiveness

- **Broadcast @ 20 lb S/ac:** + 8.5 to 12.5 bu
- **Single foliar @ 5 lb S/ac:** + 6 to 10 bu
- **Sequential foliar combos:** up to 12 bu
 - No response (i.e., crop phytotoxicity) with foliar applications at all four timings (V4, R2, R4, R6)

2017 Sulfur Response



No Sulfur



20 lb S/acre



No Sulfur



20 lb S/acre



No Sulfur

**31 pods
17 nodes
1 branch**



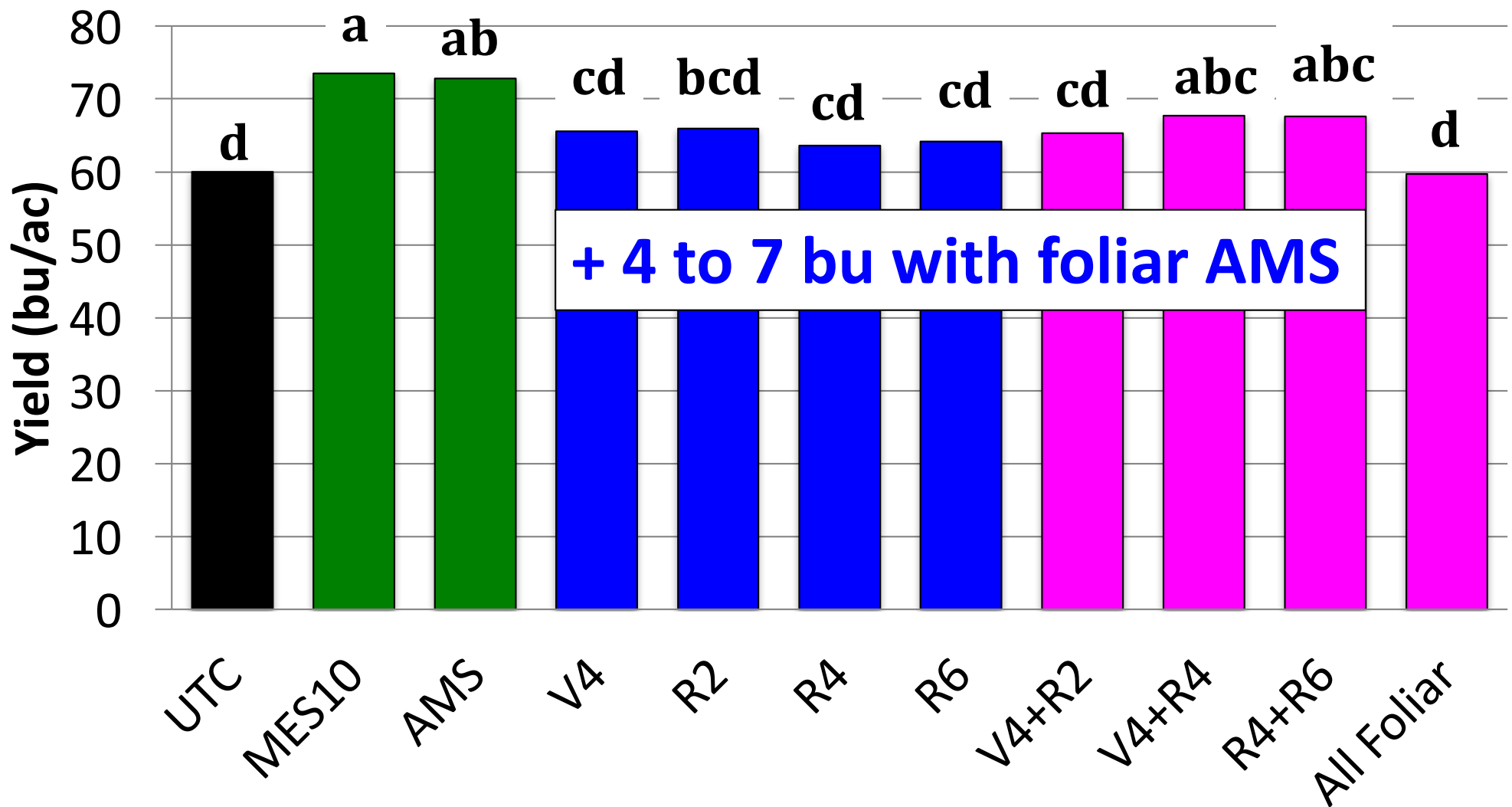
20 lb S/acre

**45 pods
18 nodes
2 branches**



2017 Sulfur Season @ LaCrosse

+ 13 bu with broadcast

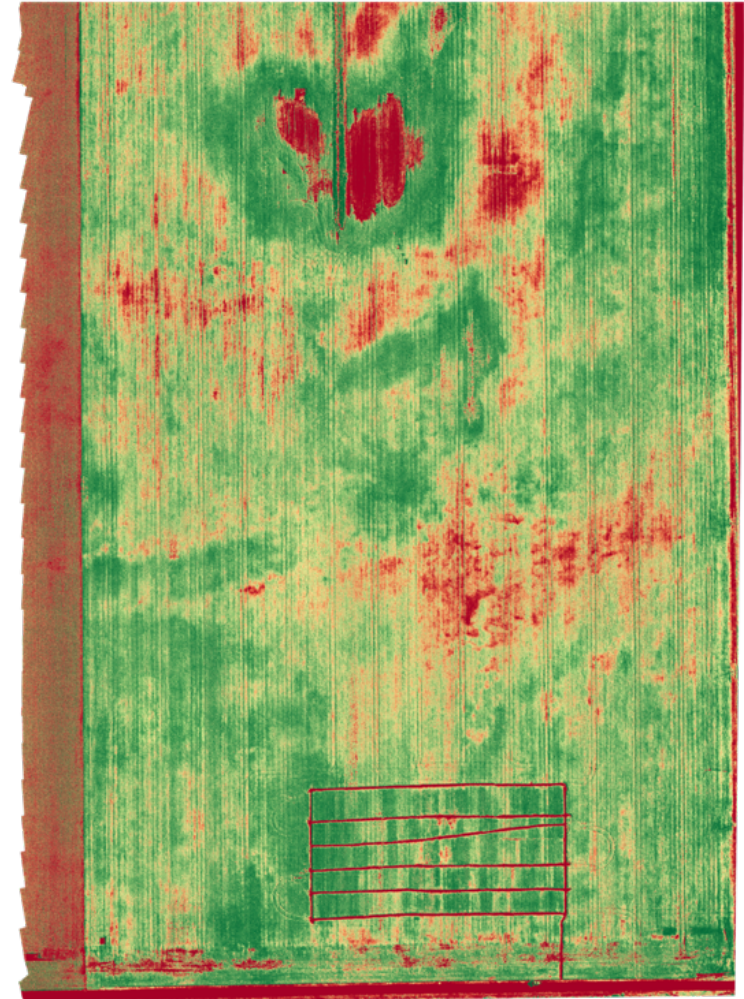


La Crosse – Soybean Sulfur

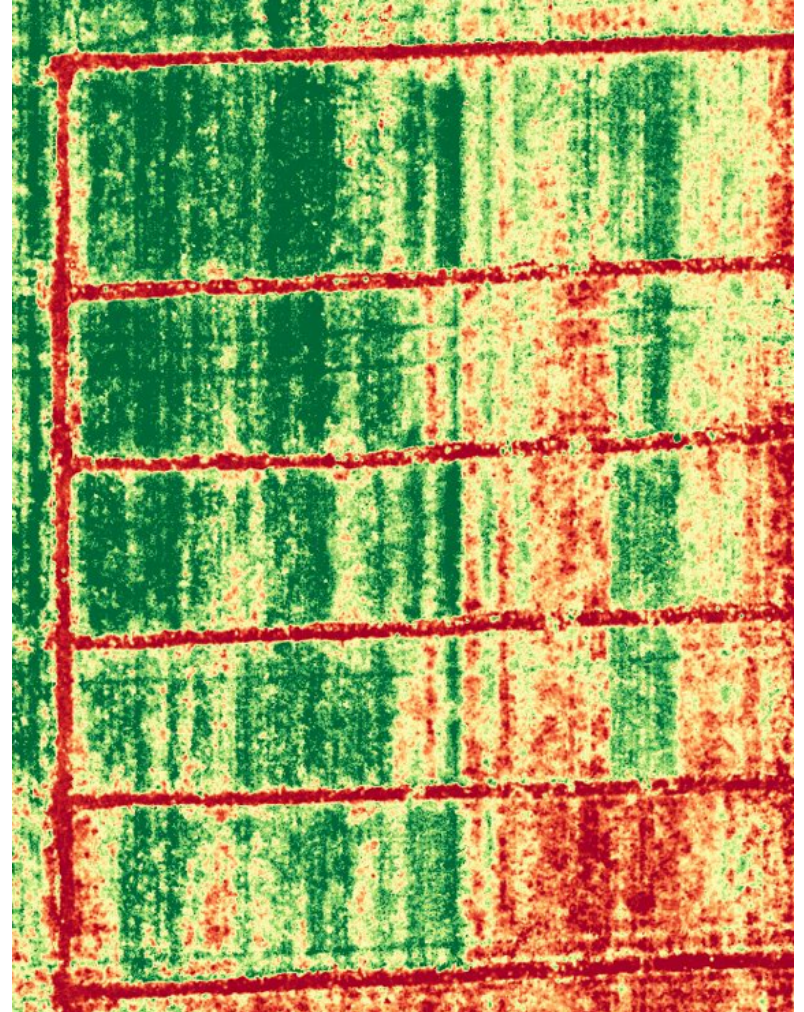
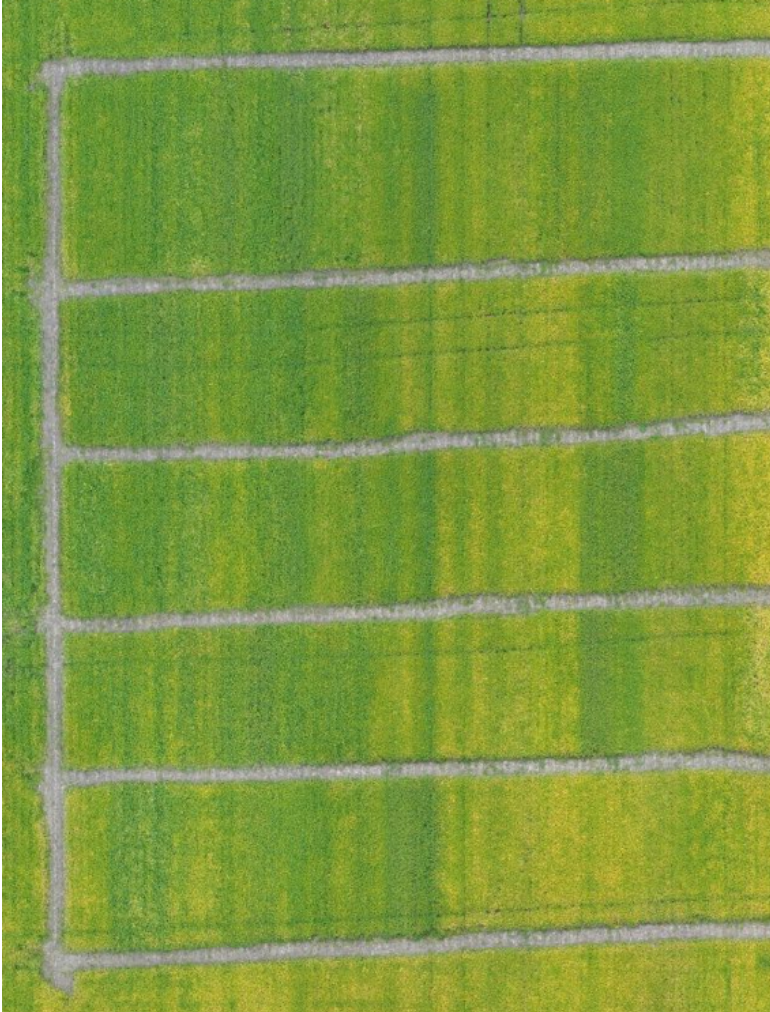
Sept 11, 2017



Soybean Sulfur – La Crosse



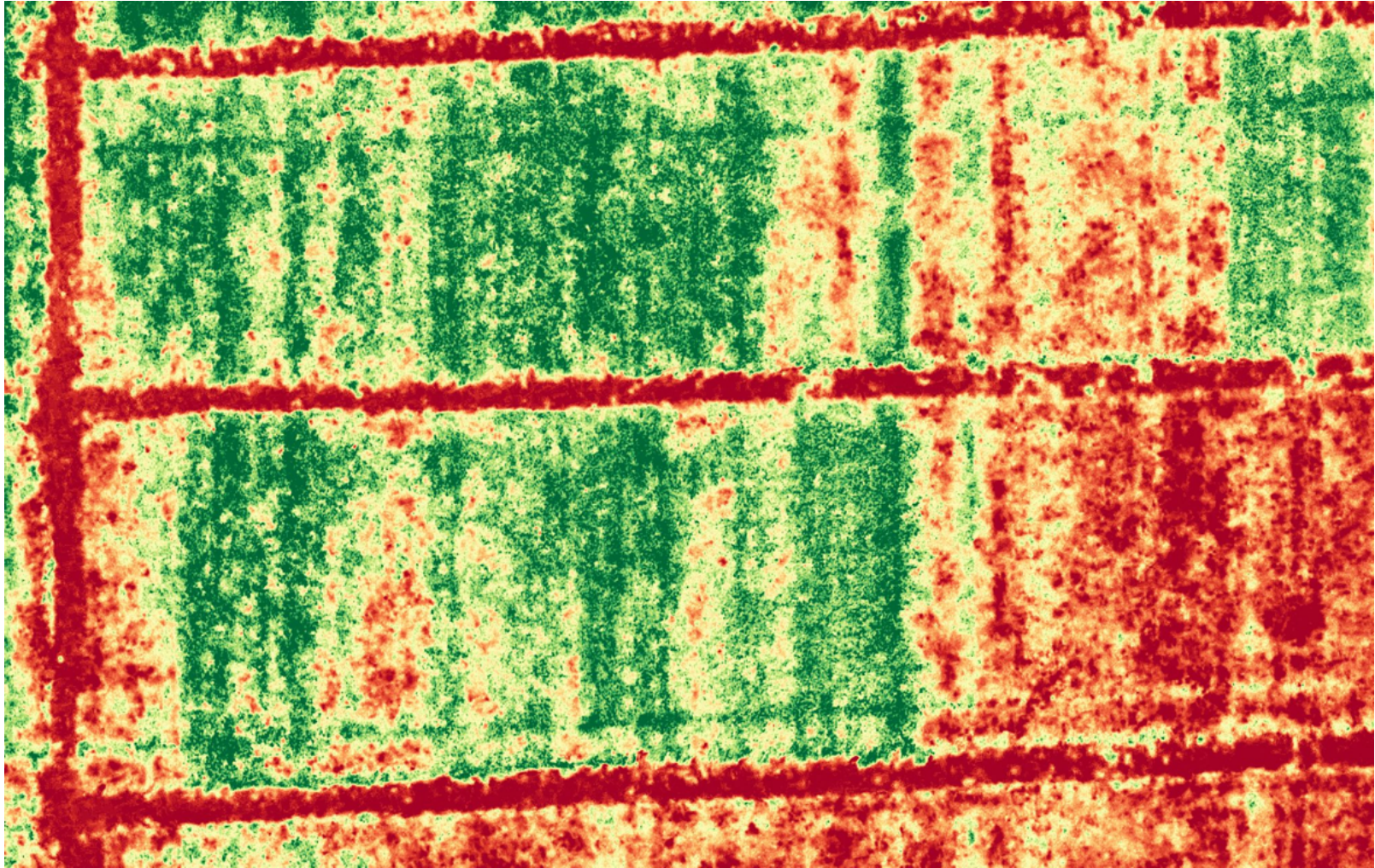
S Season at LaCrosse: Sept 11, 2017



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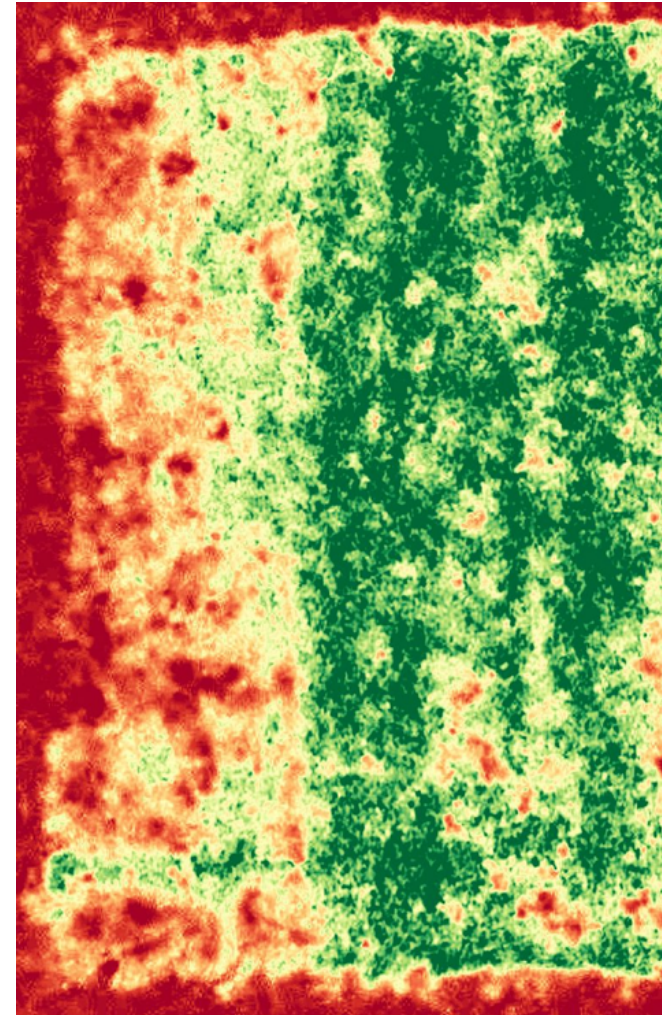


S Season at LaCrosse: Sept 11, 2017

UTC | AMS

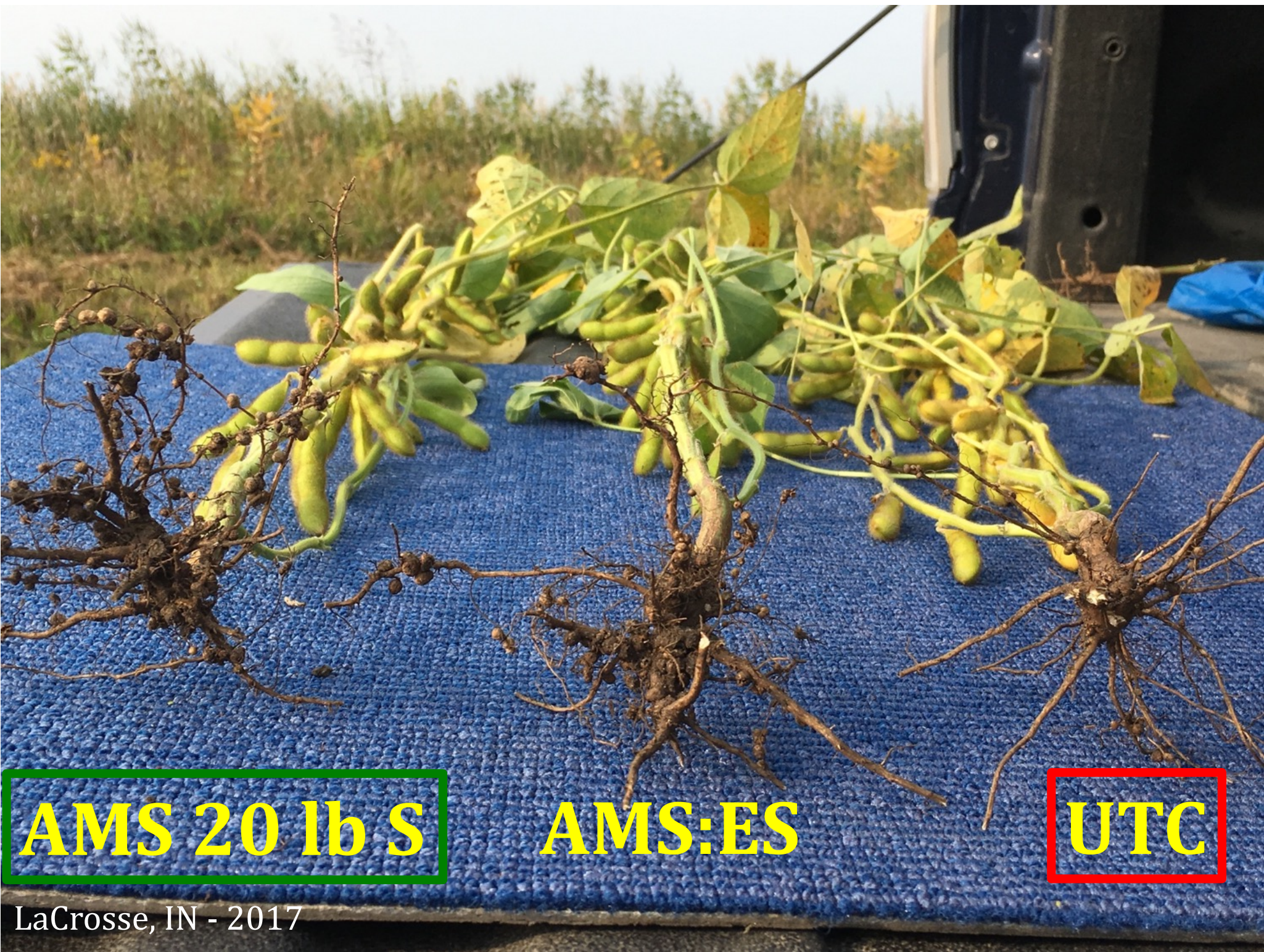


UTC | AMS



AMS 20 lb S | Untreated





AMS 20 lb S

AMS:ES

UTC

LaCrosse, IN - 2017

2017 Sulfur Responsiveness

- **Broadcast @ 20 lb S/ac:** + 13 bu
 - Similar to 2016
- **Single foliar @ 5 lb S/ac:** + 4 to 7 bu
 - Not as good as 2016
- **Sequential foliar combos:** + 5 to 7.5 bu
 - No response (i.e., crop phytotoxicity) with foliar applications at all four timings (V4, R2, R4, R6)
 - Not as good as 2016

How Much S Does Soybean Need?

Grain	lb/bu	50 bu	75 bu	100 bu
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How Much Sulfur to Apply for Soy?

- Timing of Application
- Fertilizer Source
- Severity or Need
- Soil Type
- Field Conditions

- **Starting point is ~20 lb S/ac on broadcast fertilizer late spring to early vegetative growth**
- **What about foliar sprays?**

2018 Season Considerations

- **Soil test?** Mehlich-3 extraction for S closer to planting may help... no guarantees
- **Late Spring Broadcast of 20 lb S/ac**
 - **AMS**, AMS:ES blends, MES10, Sul-Po-Mag, Gypsum...
 - Elemental S probably won't oxidize fast enough
- **Wait and See: Leaf Nutritional Snapshot**
 - May need to consider application "close" to critical S levels (0.25%) or near the 20:1 (N:S ratio)...maybe more like ~18:1