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Rice ‘Strawlage’:

A Feed for Drought Induced Feed Shortages?

P.H. Robinson, G. Nader, N Swanepoel, J. Davy
with Herb Holzapfel and Henry Smith

UCCE, Davis, Sutter/Yuba, Tehama

UCCE Rice Straw Research: A long term research project

- **Funded by the California Rice Research Board**
 - to investigate options to better use rice straw as an animal feed
- **Headed by Glenn Nader**
 - kept the focus on rice straw as animal feed
 - kept the focus on practicality and on new markets
- **So far, we have not found all of the answers, but we may have found some of the answers**

First Focus

To create a 'mixer ready' forage for the dairy industry

- **Eliminate mixing problems of 'traditional' rice straws**
 - often wrecked mixers
- **Eliminate the need to chop or grind rice straw prior to mixing**
 - air quality regulations meant that this was no longer practical
- **Determine the maximum incorporation level in TMR**
 - eliminate sorting and refusals

SUMMARY OF DAIRYMAN RESPONSES

	Sickle Chop	Slicer Bailed
Particle length uniformity ^a	4.8	6.6
Color ^a	7.8	8.0
Texture ^a	7.6	7.2
Mixability ^a	4.2	6.0
Mixing time affected ^a	6.0	6.6
Sorting (10=no sorting) ^a	5.8	7.0
Leftover RS eaten ^a	6.4	8.4
Overall experience ^a Before	6.1	7.1
Overall experience ^a After	5.4	7.0
How likely to use again ^a	5.4	7.8

a = 0 to 10 (0=poor, 10=excellent)

Double Chop Rice Straw in a Heifer TMR

20% of DM intake was possible

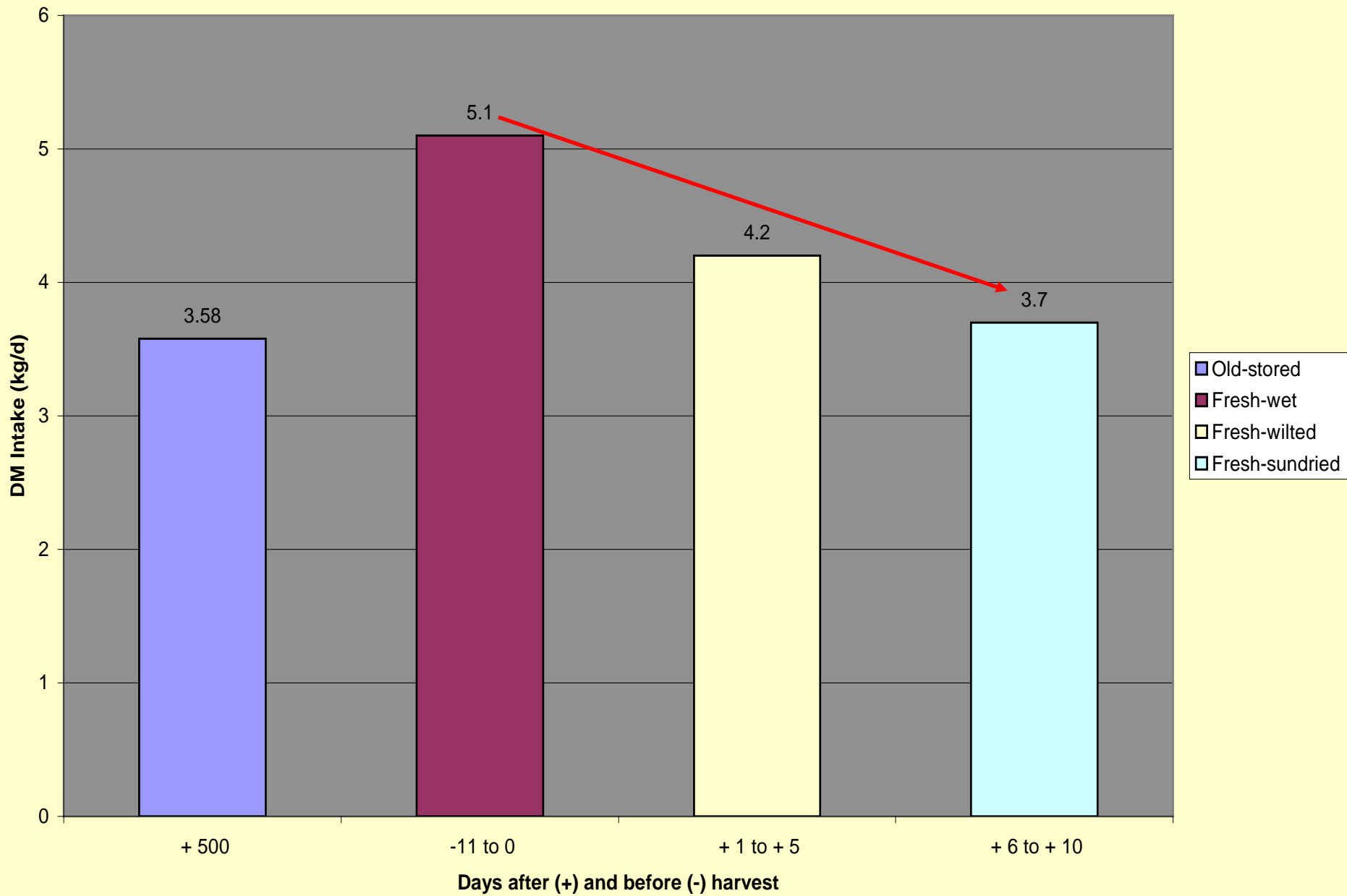


Second Focus

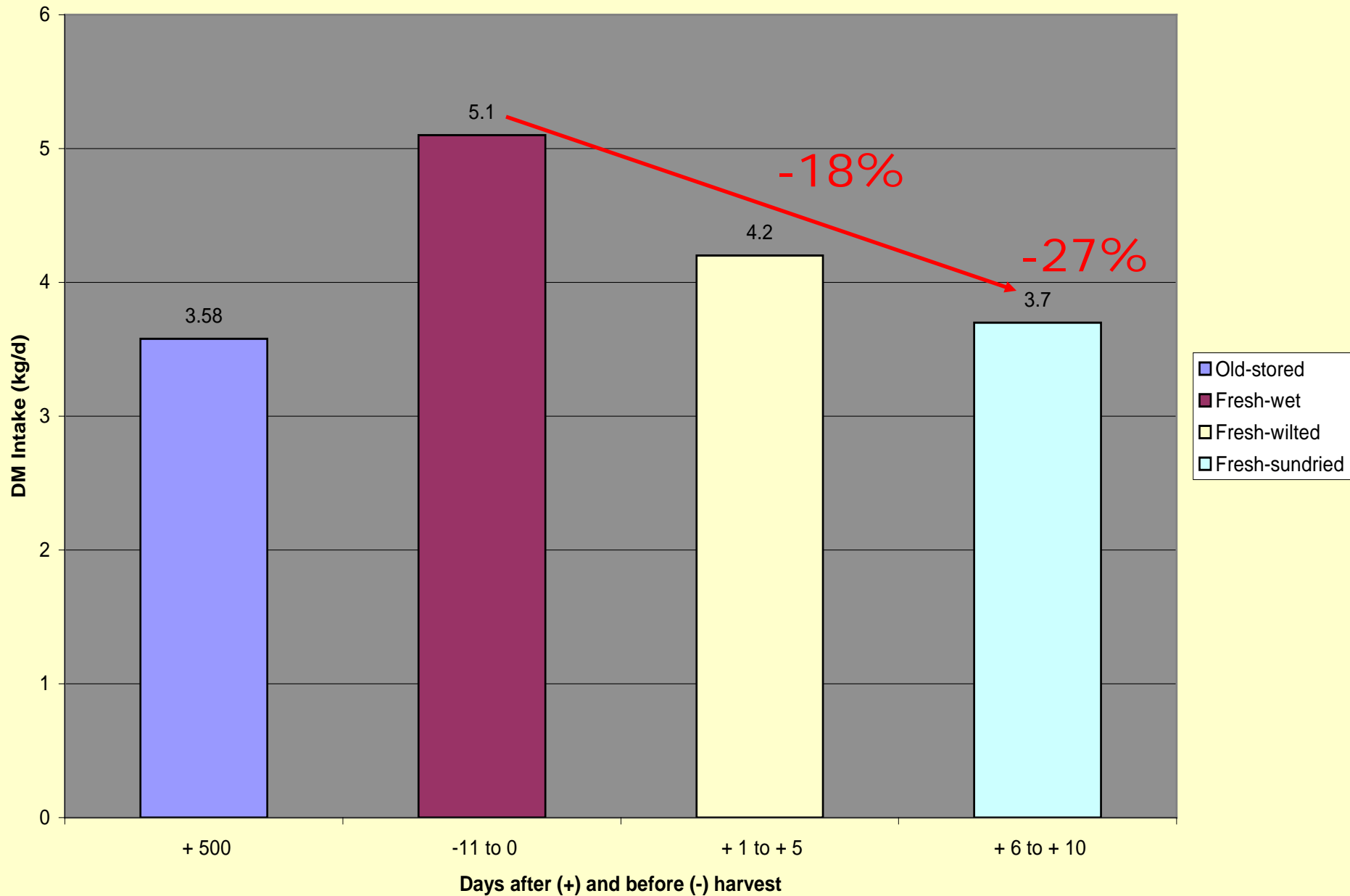
To create a forage with a higher nutrient value

- **For dairy cattle operations:**
 - allow higher feeding levels in heifer and dry cow TMR
- **For beef cow/calf operations:**
 - create a forage that could be close to the sole diet to beef cows

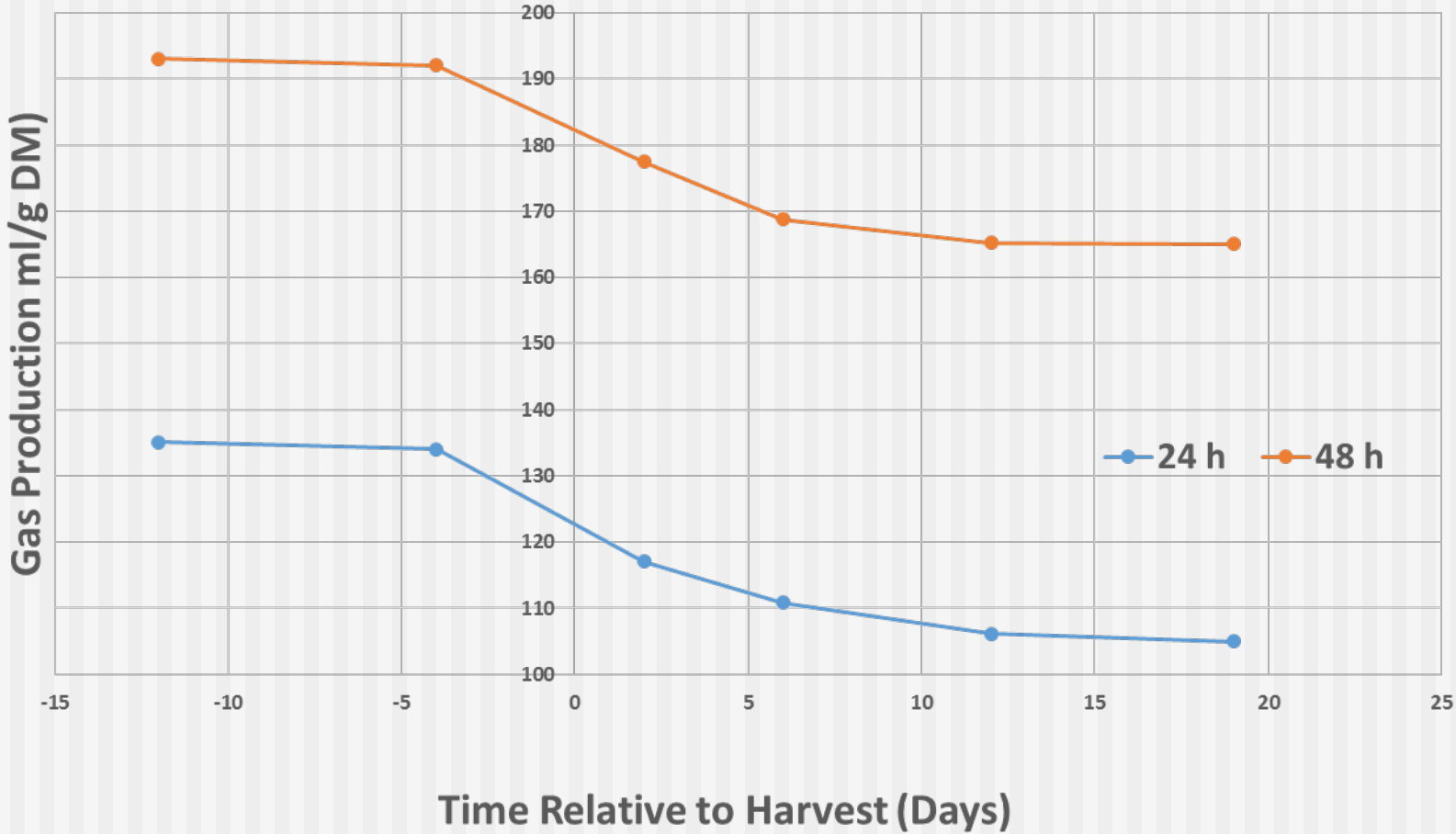
Mean dry matter intake from old-stored, fresh-wet, fresh-wilted and fresh-sundried rice straw



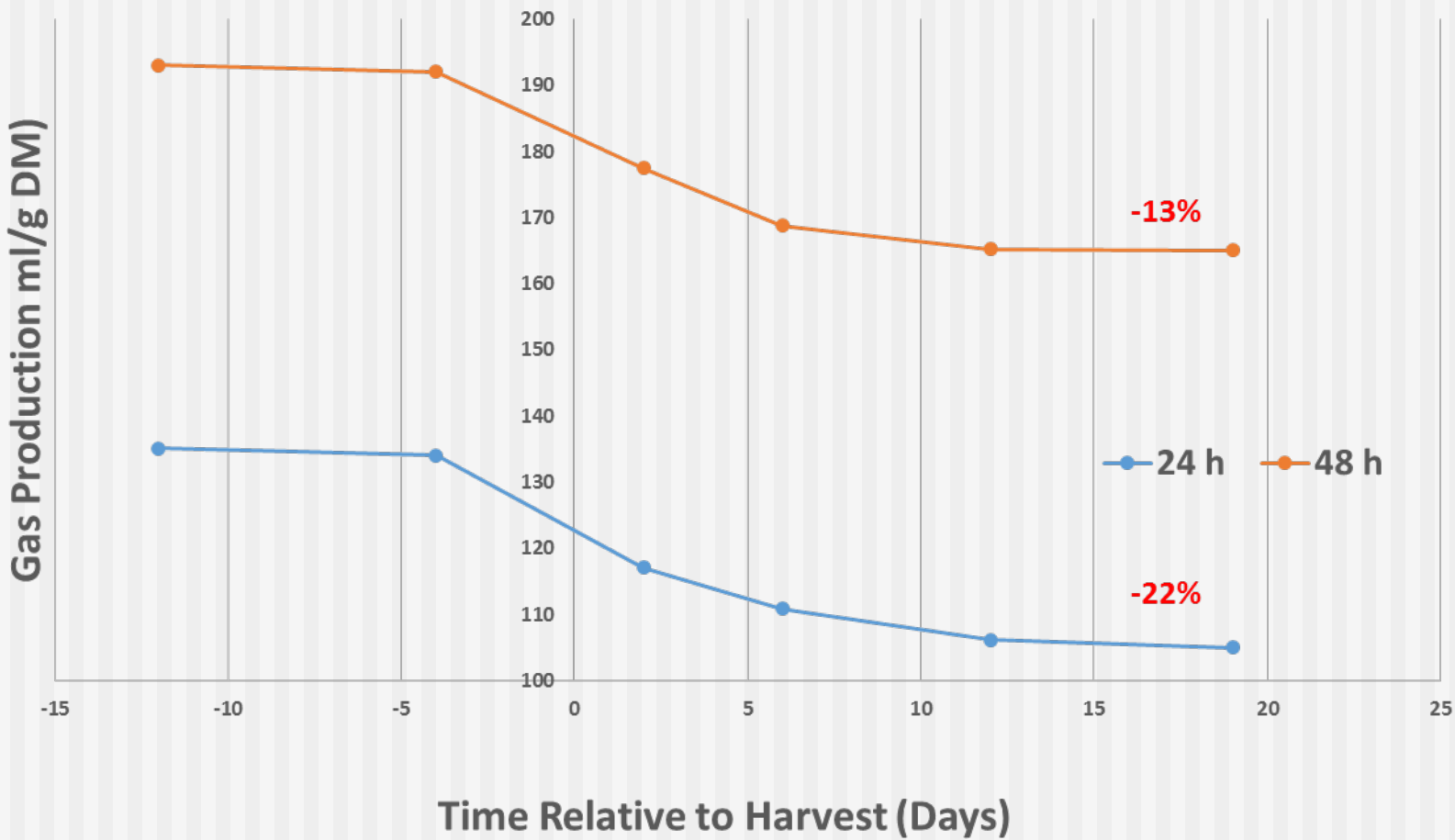
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Time Relative to Harvest vs. Gas Production



Time Relative to Harvest vs. Gas Production



Conclusions

- **Dry down is associated with a change in rice straw that:**
 - **depresses intake by ~30%**
 - **depresses energy level ~20%**
- **Changes a forage with modest nutritional value to one with a very low nutritional value**

So What about High Moisture Rice Straw?



One of the Test Rice 'Strawlage' Stacks



The Experimental Plan

Stack 1

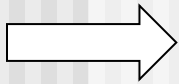
Stack 2

Stack 3

Control

Urea +
UN32

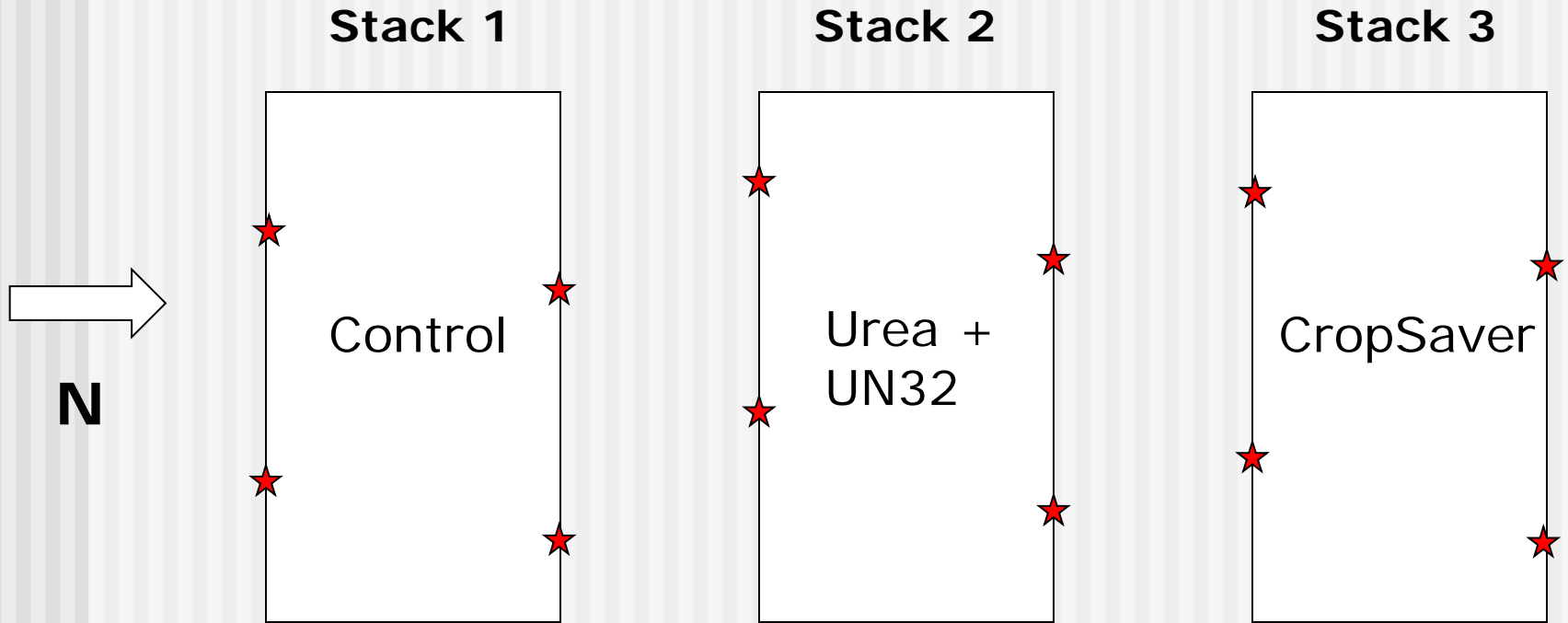
CropSaver



N

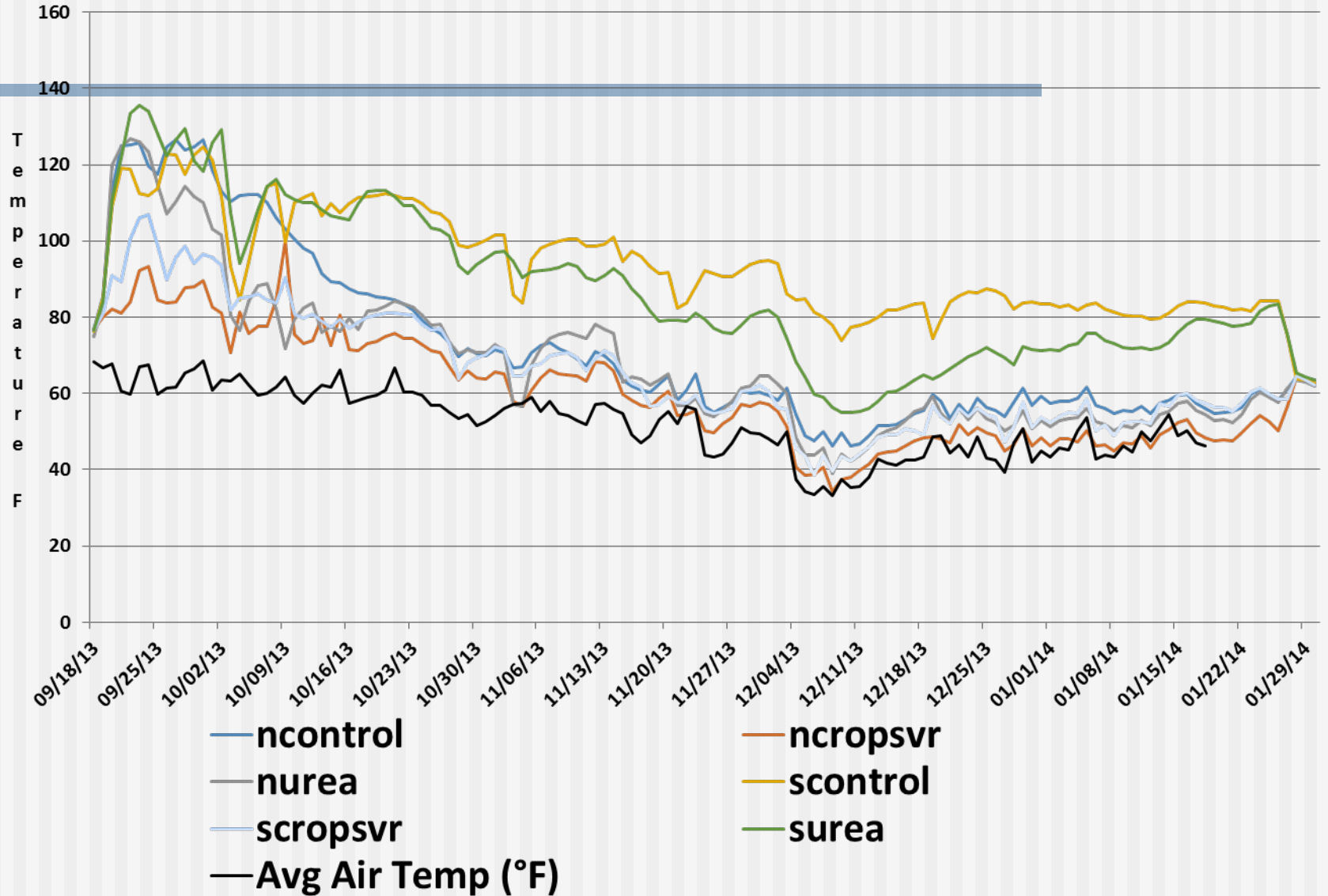
All stacks were 16 bales and covered with plastic

The Experimental Plan

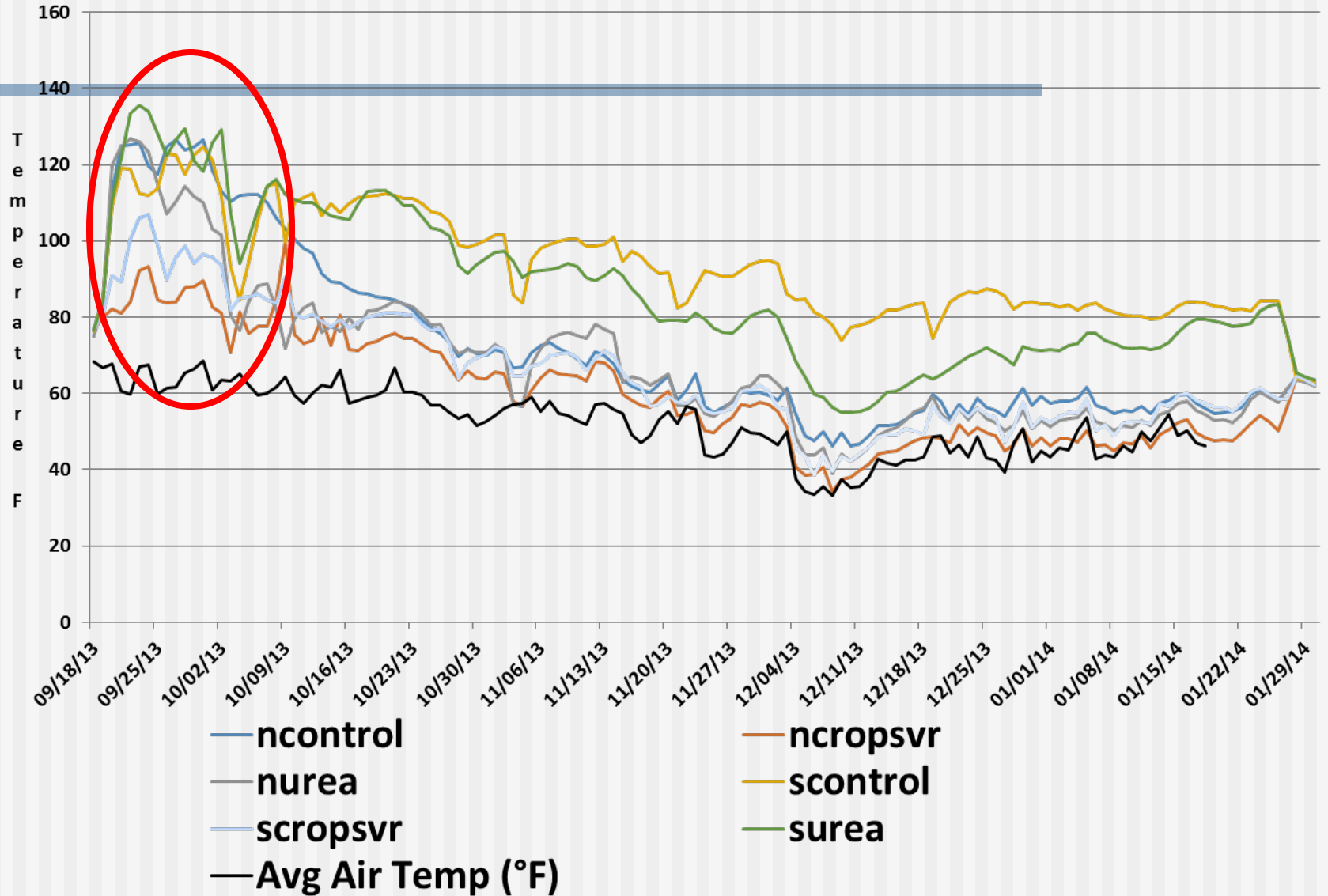


All stacks were probed to 20" at 0, 27, 64, 95 and 130 days

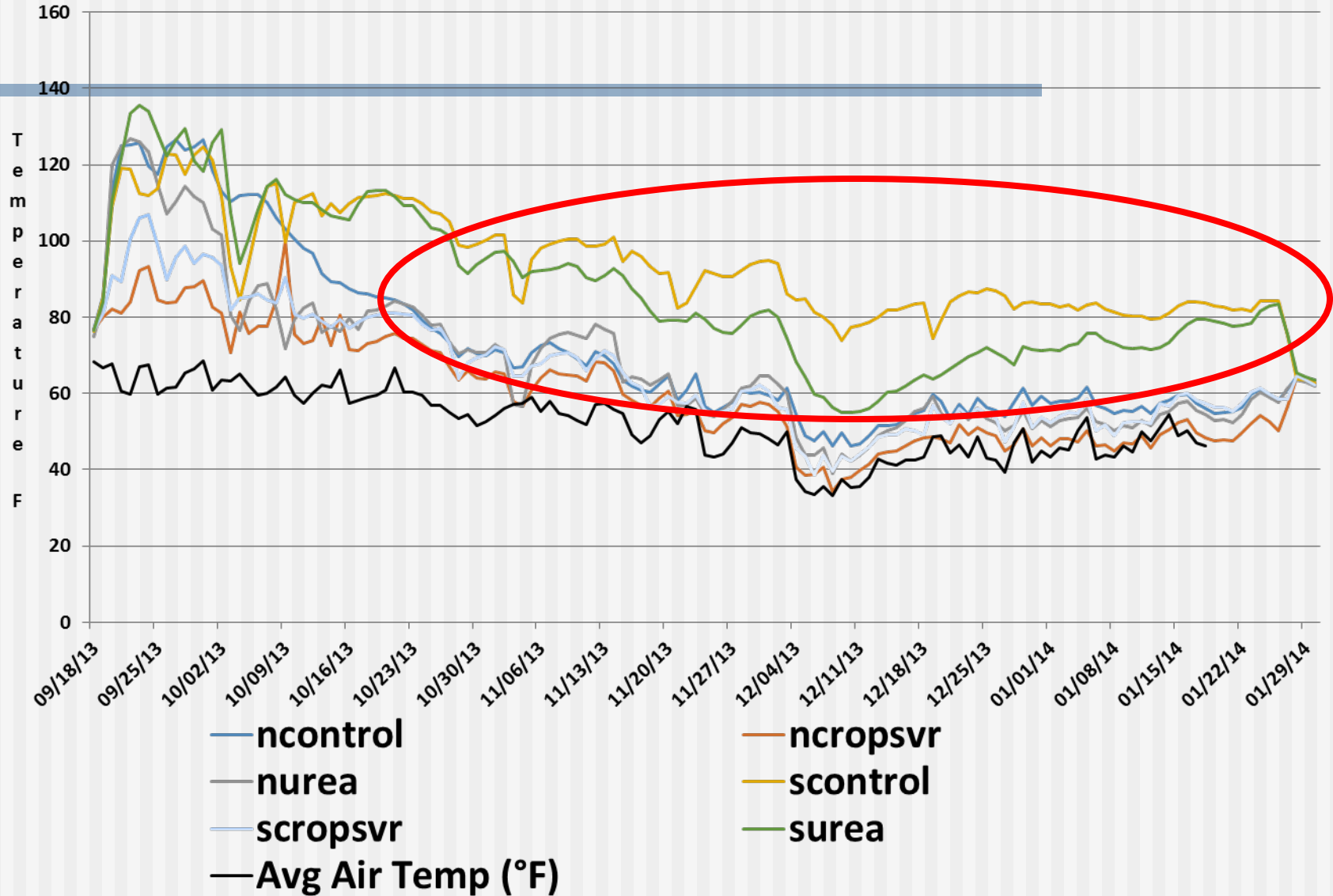
Rice Strawlage Temperatures



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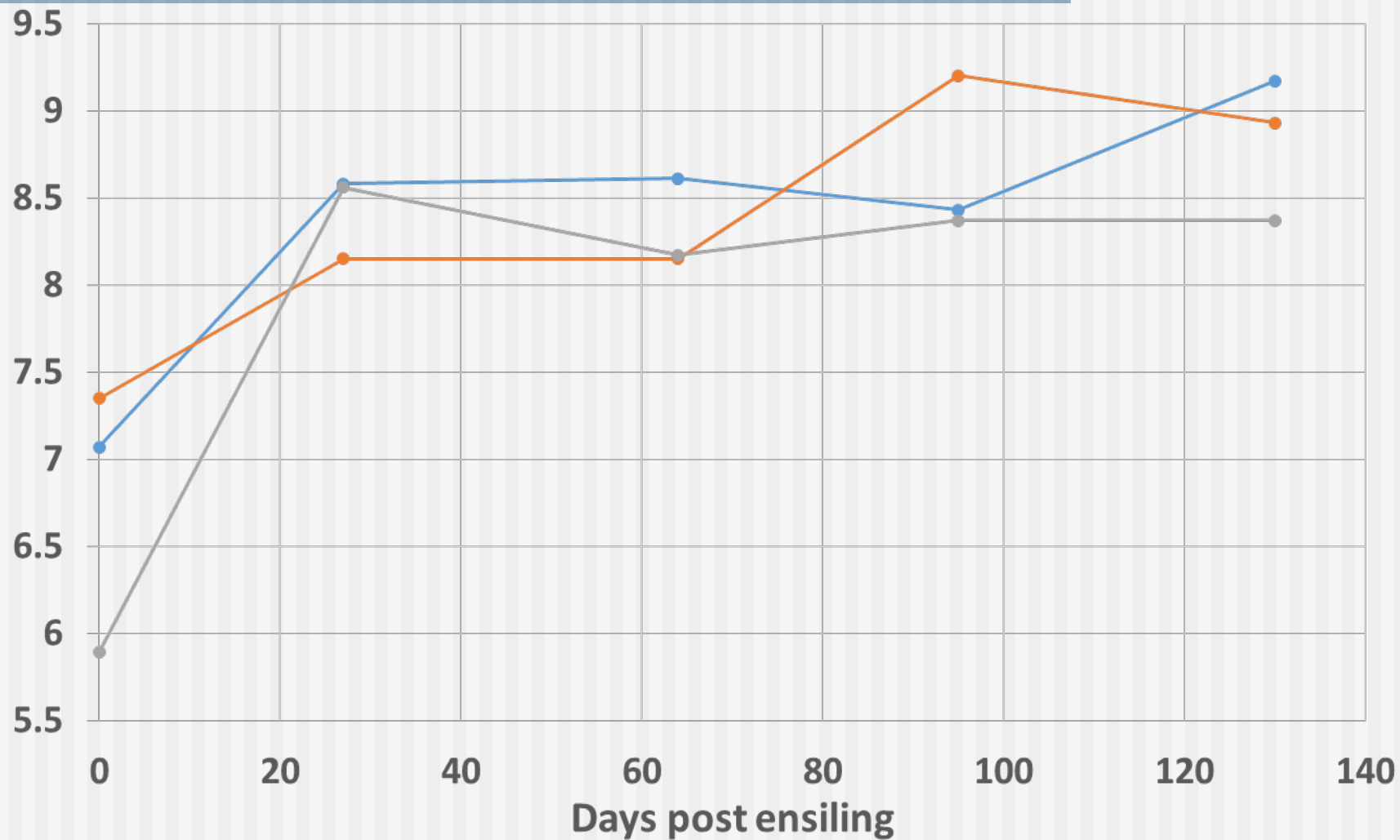


Why don't the stacks catch fire?

- Covered with a tarp
 - limits oxygen for aerobic fermentation
- 50% moisture
 - heat must dry it down for combustion to occur
- Limited sugars
 - $>130^{\circ}\text{F}$ for only 5 days

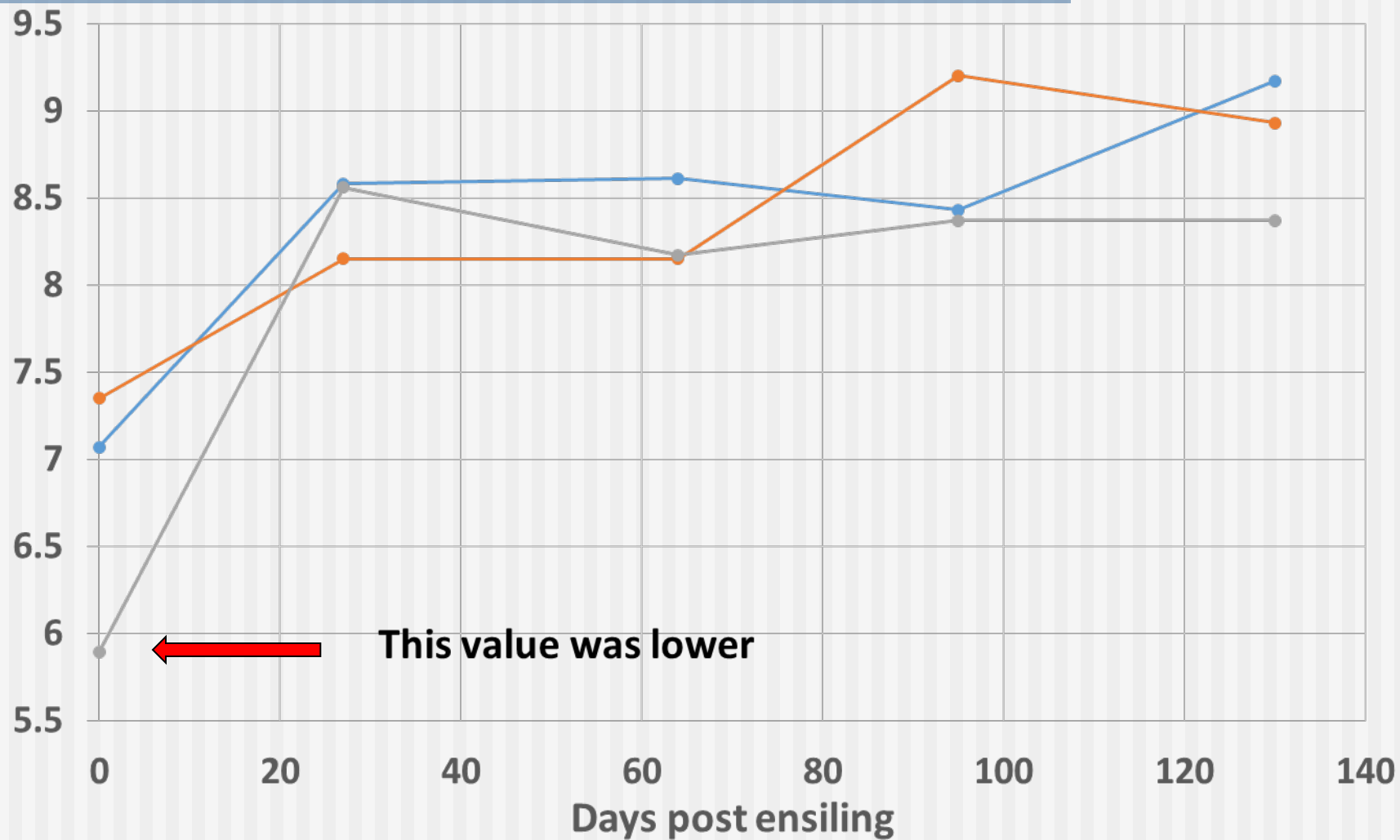
Rice Strawlage pH

Control Urea CS



Rice Strawlage pH

Control Urea CS



Rice Straw Haylage at 60 days

Control



Urea & UN 32



Rice Straw Haylage at 60 days

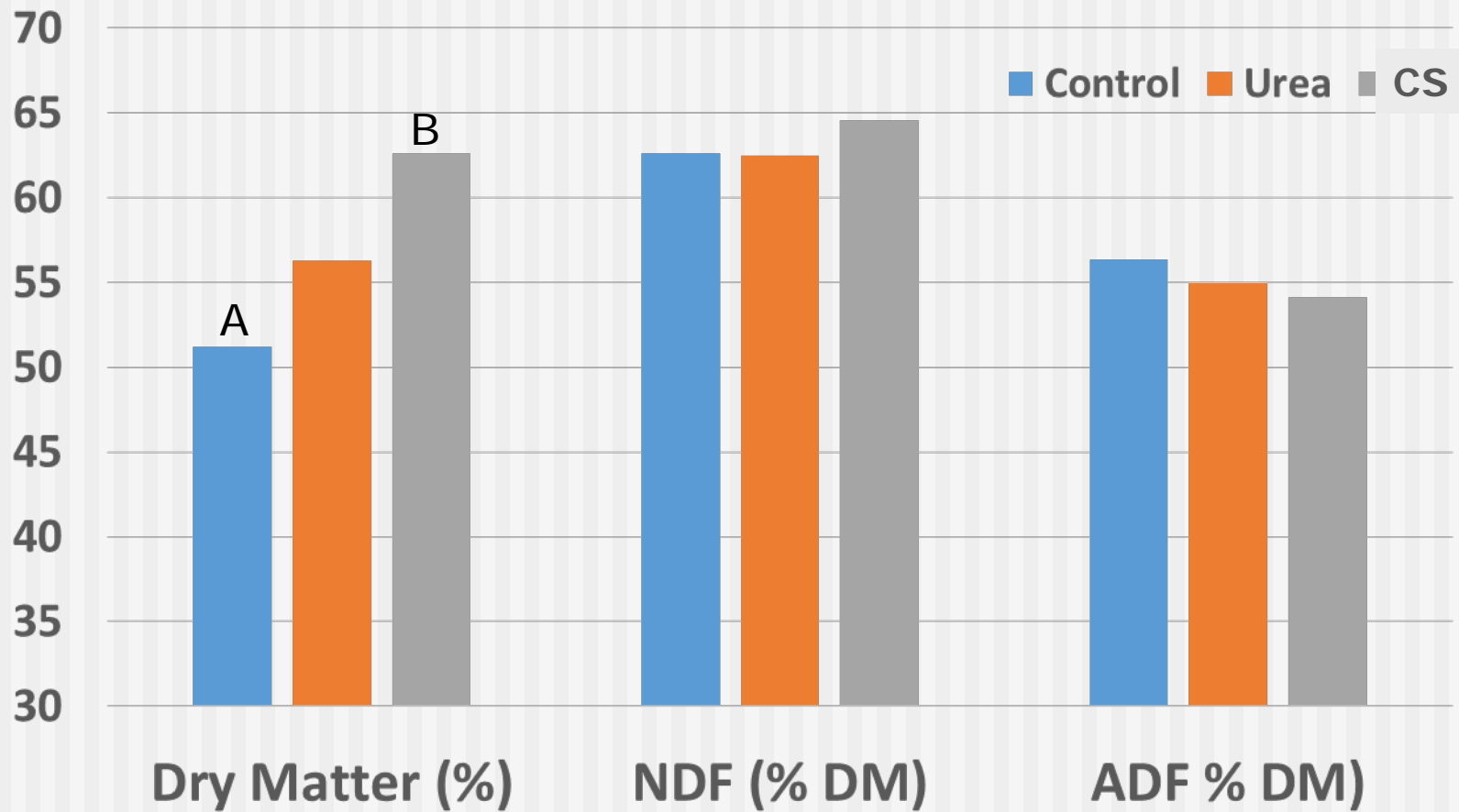
Control



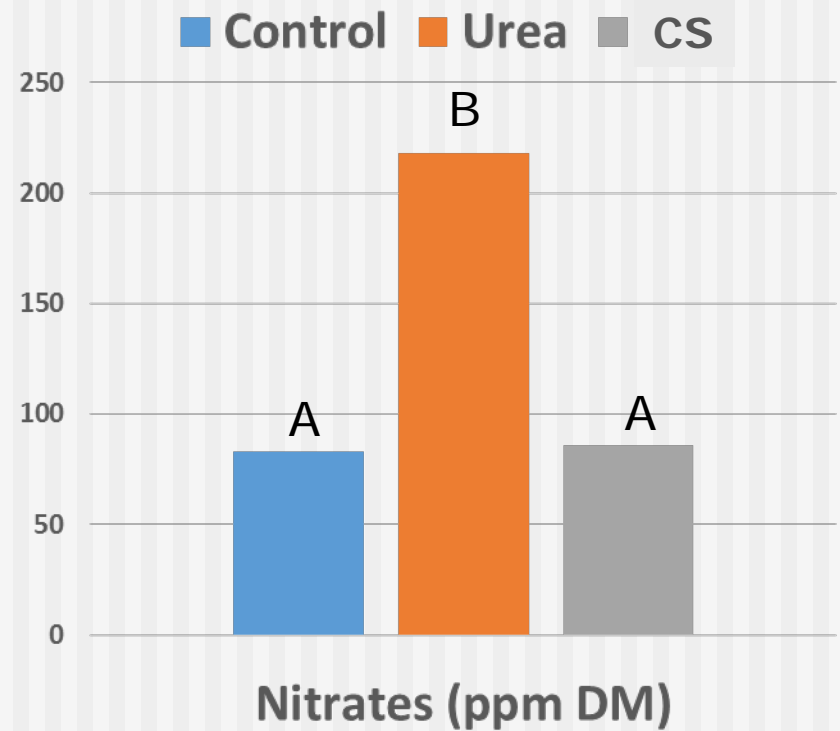
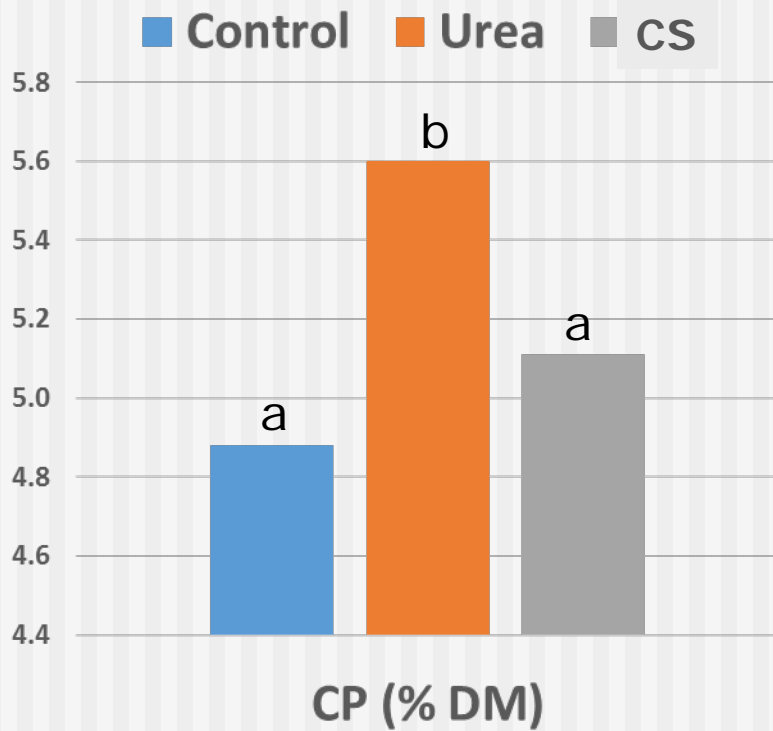
Cropsaver



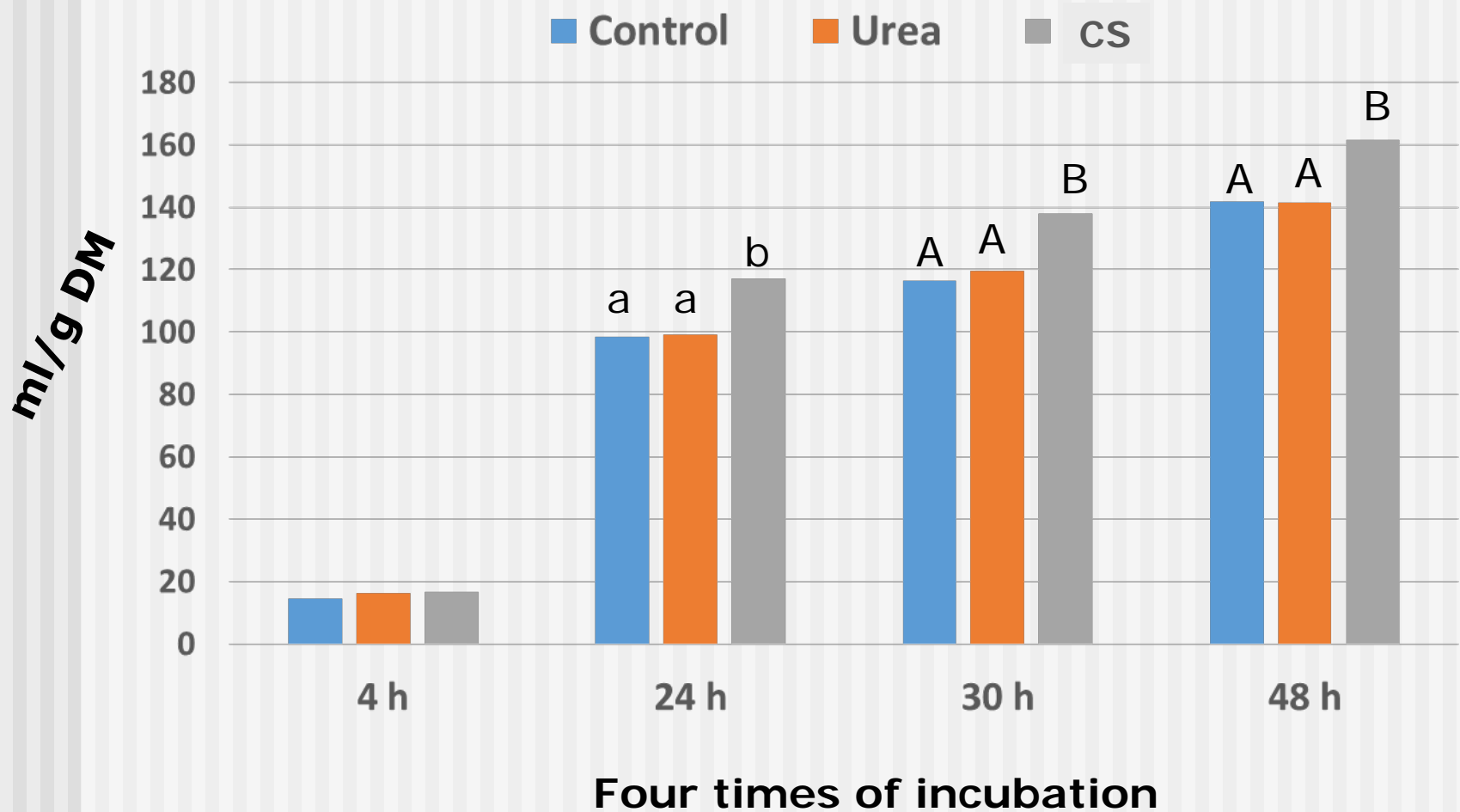
Impacts on Moisture and Fiber



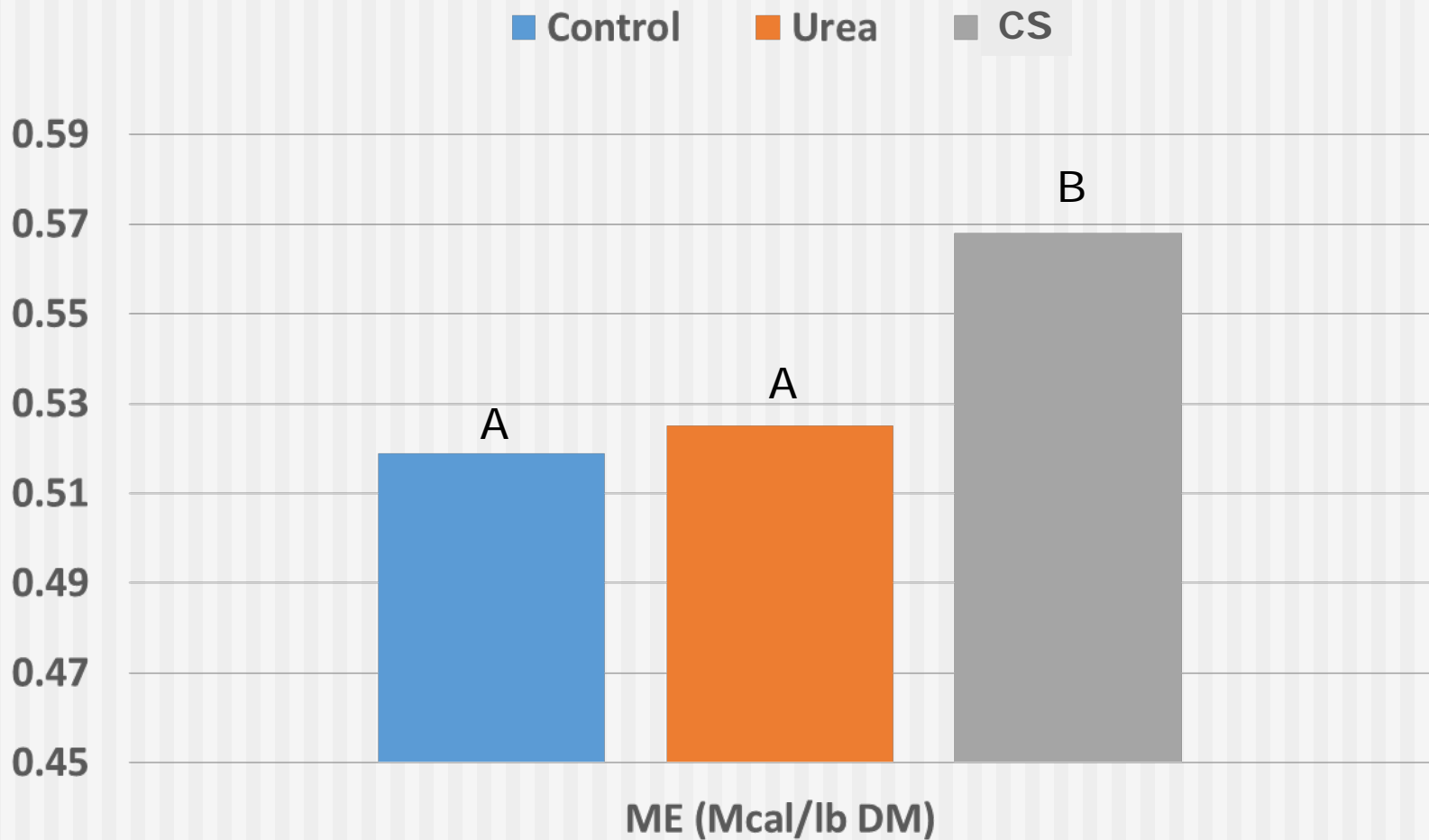
Impacts on Protein and Nitrates



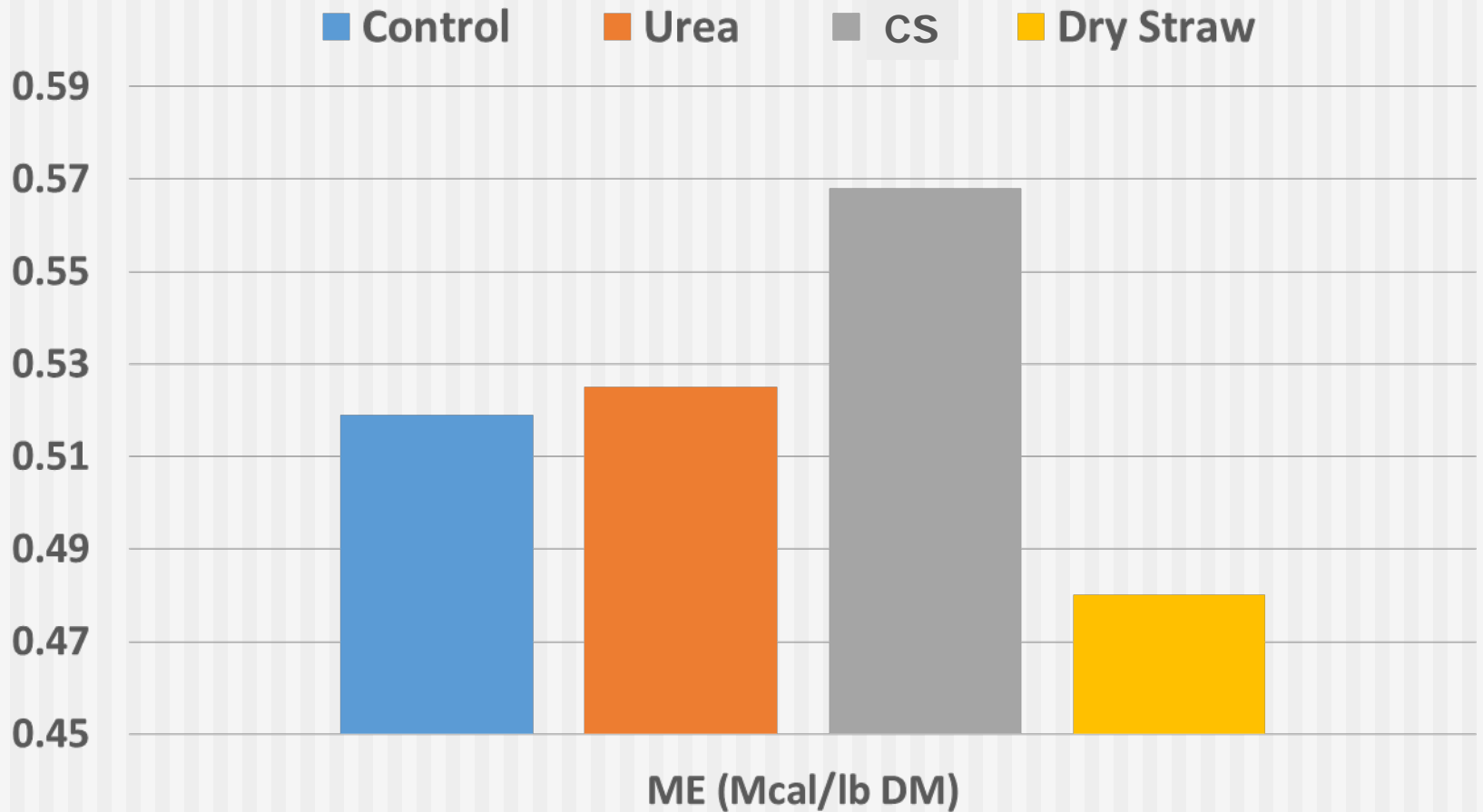
Impacts on Gas Production



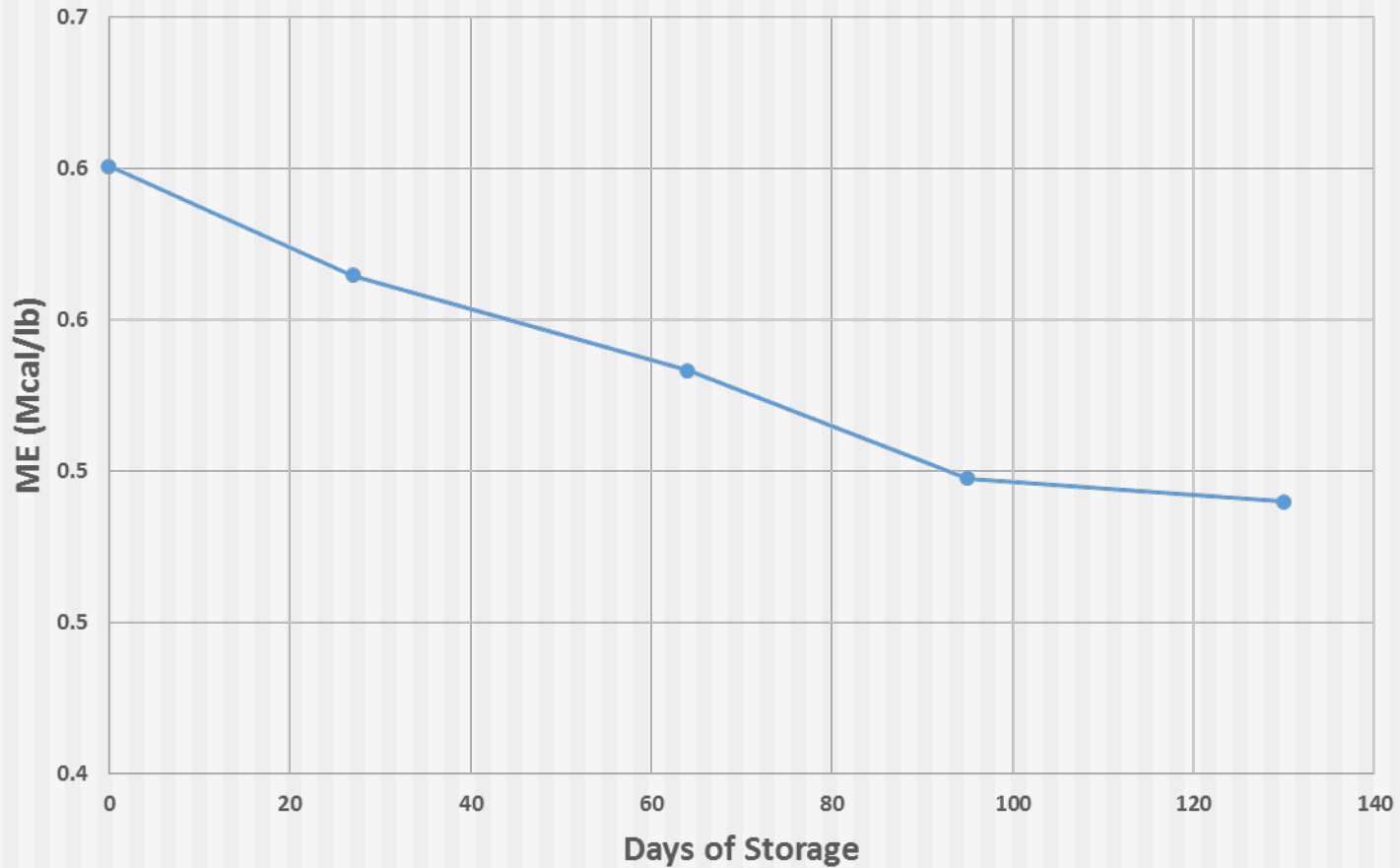
Impacts on Estimated Metabolizable Energy



Impacts on Estimated Metabolizable Energy



Impacts of Time of Storage on Estimated Metabolizable Energy



Bales at Feedout





Possible use of Vents ??







Beef Cattle Eating Ensiled Rice Straw



Beef Cattle Eating Strawlage

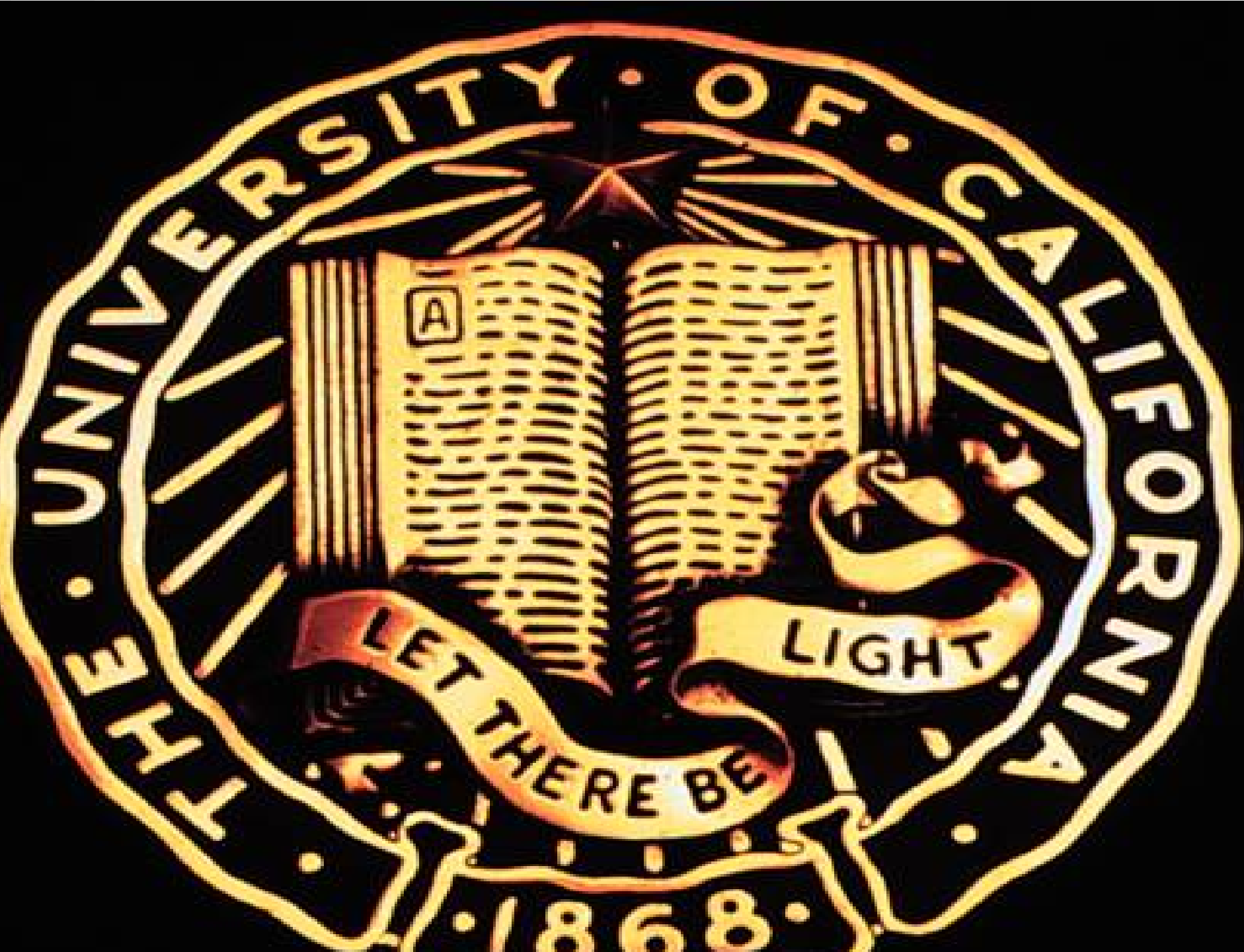


Overall

- **Rice straw can be prepared to be 'mixer ready'**
- **'Double chop' dry rice straw works in TMR up to 20% of DM**
 - but energy value remains low due to changes during field drying
- **Nutrient value of rice straw can be increased as 'strawlage'**
 - Urea treatment increases CP content more than ME
 - HS treatment increases ME more than CP

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- Rice straw can be prepared to be 'mixer ready'
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 - but energy value remains low due to changes during field drying
- Nutrient value of rice straw can be increased as 'strawlage'
 - Urea treatment increases CP content more than ME
 - HS treatment increases ME more than CP
 - *but animal response appears more than the ME/CP increase*
- **Fall 2014 research will address this phenomimum**



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LET THERE BE

LIGHT

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