



**NITROGEN STABILIZER EMERGING
TECHNOLOGY-SUGARCANE/LACA 2022**

CULLEN MINTER | KAS TERRITORY BUSINESS MANAGER

KAS Enhanced Efficiency Fertilizers

Urease Inhibitor



Green represents urease inhibitor.

Nitrification Inhibitor



Purple represents nitrification inhibitor.

Dual Inhibitor

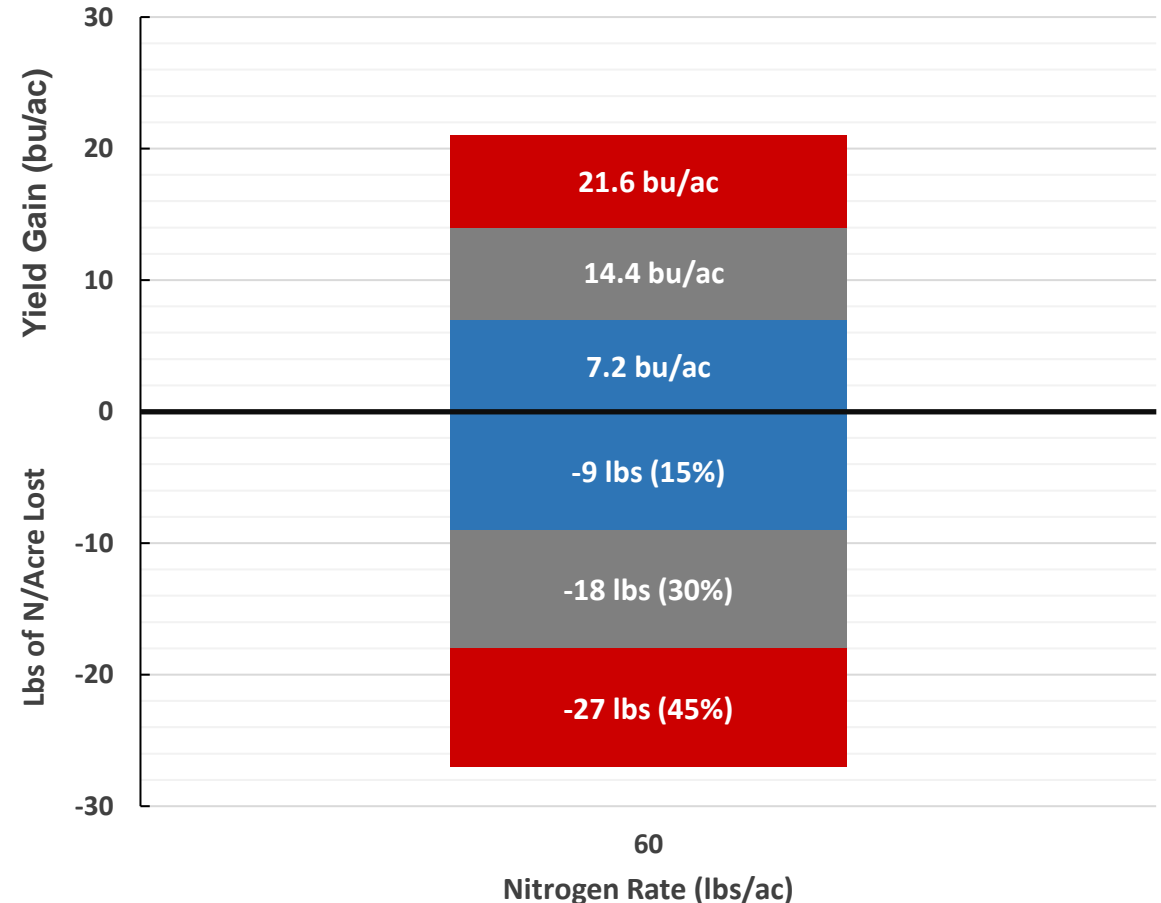


Blue represents dual inhibitor

Potential Losses from UAN Applications and Missed Yield Gain Opportunity

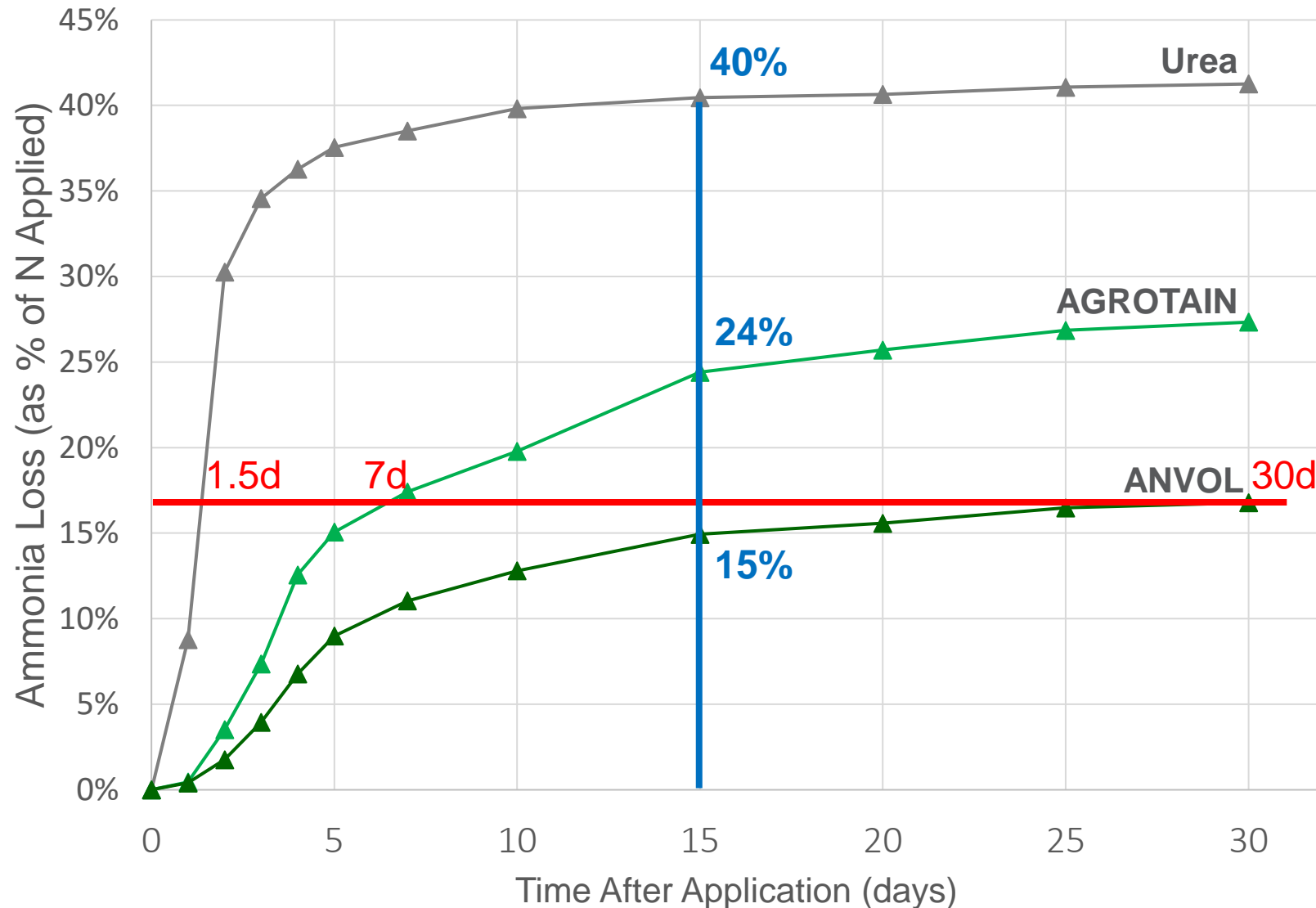
- Cumulative nitrogen loss assumptions based on multiple peer-reviewed studies and land grant extension publications
- UAN total nitrogen losses can be as high as 45% if not adequately incorporated and/or protected with a nitrogen stabilizer such as CENTURO® or ANVOL®.
- For example, if 60 lbs of untreated UAN was applied per acre, a grower could lose up to 9 lbs or 15% of total applied nitrogen. Under optimum N rates a grower could potentially forfeit 7.2 bu/acre of corn yield.

- Conversion Rate: 0.8 lbs N = 1 bu
- Cumulative losses assume both above- and below-ground losses
- 45% loss is representative of a worst case application scenario



The underlying graph was produced by Koch Agronomic Services and derived from a survey peer-reviewed studies and Land Grant Universities extension publications in North America. The value represents a hypothetical loss and opportunity cost scenario. ¹Adequate incorporation means more than .5 inch of rain or irrigation or mechanical incorporation into the soil of more than 2 inches deep.

ANVOL™ Reduces Volatilization



- Location: Santa Maria, RS, Brazil, 2019
- Method: Semi-open chamber
- Nitrogen rate: Surface broadcast 50% N rate of 37.5 kg N/ha. Additionally, 25 kg N/ha (in a blend with P & K) applied to all treatments incorporated at planting
- Soil type: Soil class Podsol
- Soil pH: 5.5, OM: 3.1, Clay: 25.4

The underlying data was provided by Universidade Federal de Santa Maria, Brazil under a Research Agreement with Koch Agronomic Services, LLC and neither these institutions, nor the individual researchers referenced, endorse or recommend any product or service.

CENTURO™ Nitrogen Stabilizer



The next-generation **nitrification inhibitor** for anhydrous ammonia and UAN is **EFFECTIVE** and **FLEXIBLE**.

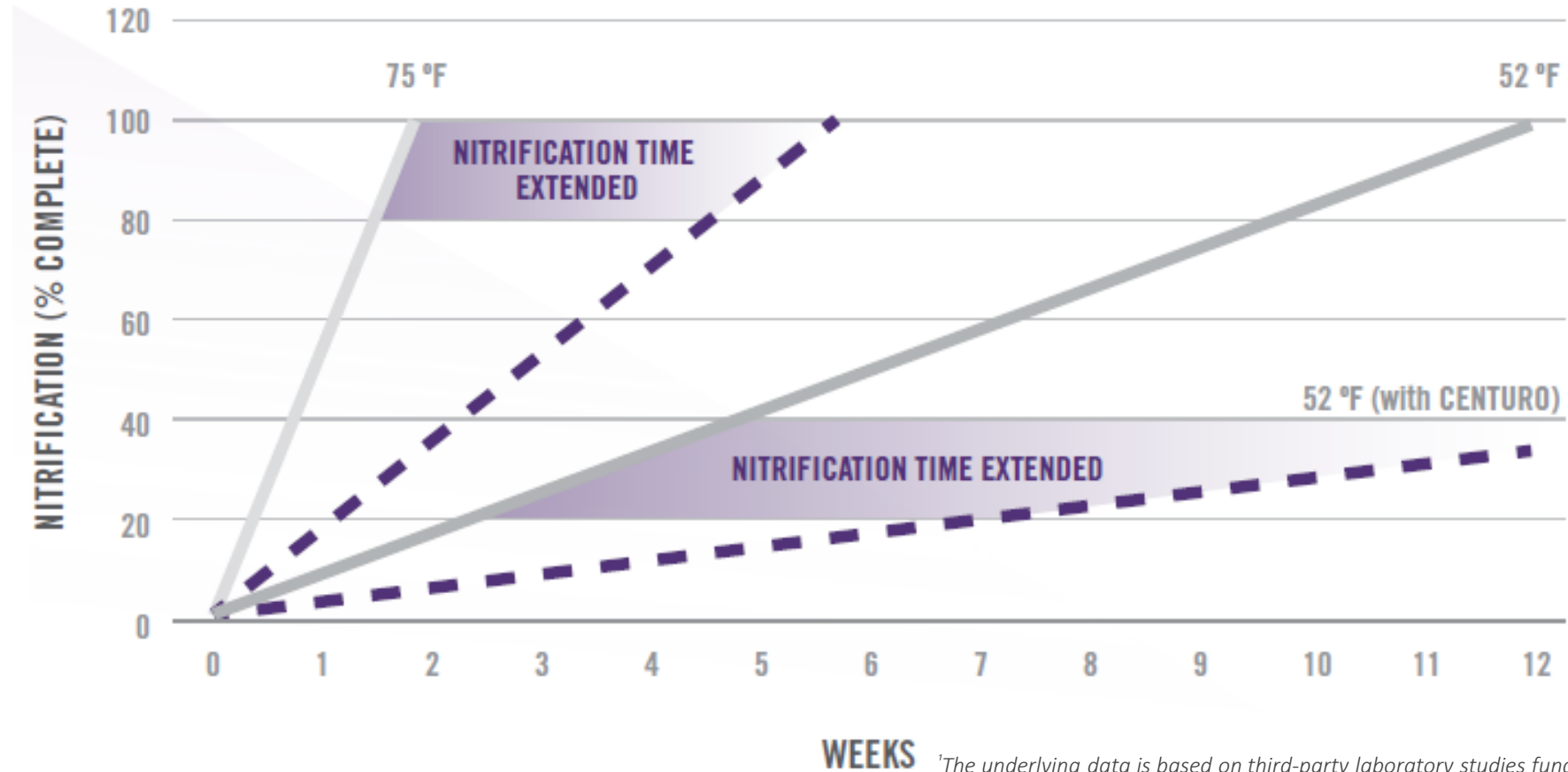
- Reduces nitrate leaching potential
- Slows denitrification loss
- Optimizes yield and NUE
- Gentle on equipment
- Easy to transport, use, and store

Active Ingredient	
Pronitridine	14%

Usage Rates	
NH ₃	5 gal/ton
UAN	1.5-2.5 gal/ton
Manure	0.5 gal/ac

CENTURO[®] Mode of Action Benefits

MODEL OF CENTURO'S IMPACT ON NITRIFICATION RATES AT VARIOUS TEMPERATURES (APPROXIMATED)



¹The underlying data is based on third-party laboratory studies funded by Koch Agronomic Services; results may vary based on a number of factors, including environmental conditions. Graph is derived from the Nutrient Management for Agronomic Crops in Nebraska (Tim Shaver, p.7) and third-party laboratory studies funded by Koch Agronomic Services.

Denitrification

Microbial process where NO_3^- is converted to N_2 gases that are lost to the atmosphere

- Denitrification proceeds rapidly when water filled pore space in soil exceeds 60%
- Denitrification is most rapid at temperatures between 80°-100° F.

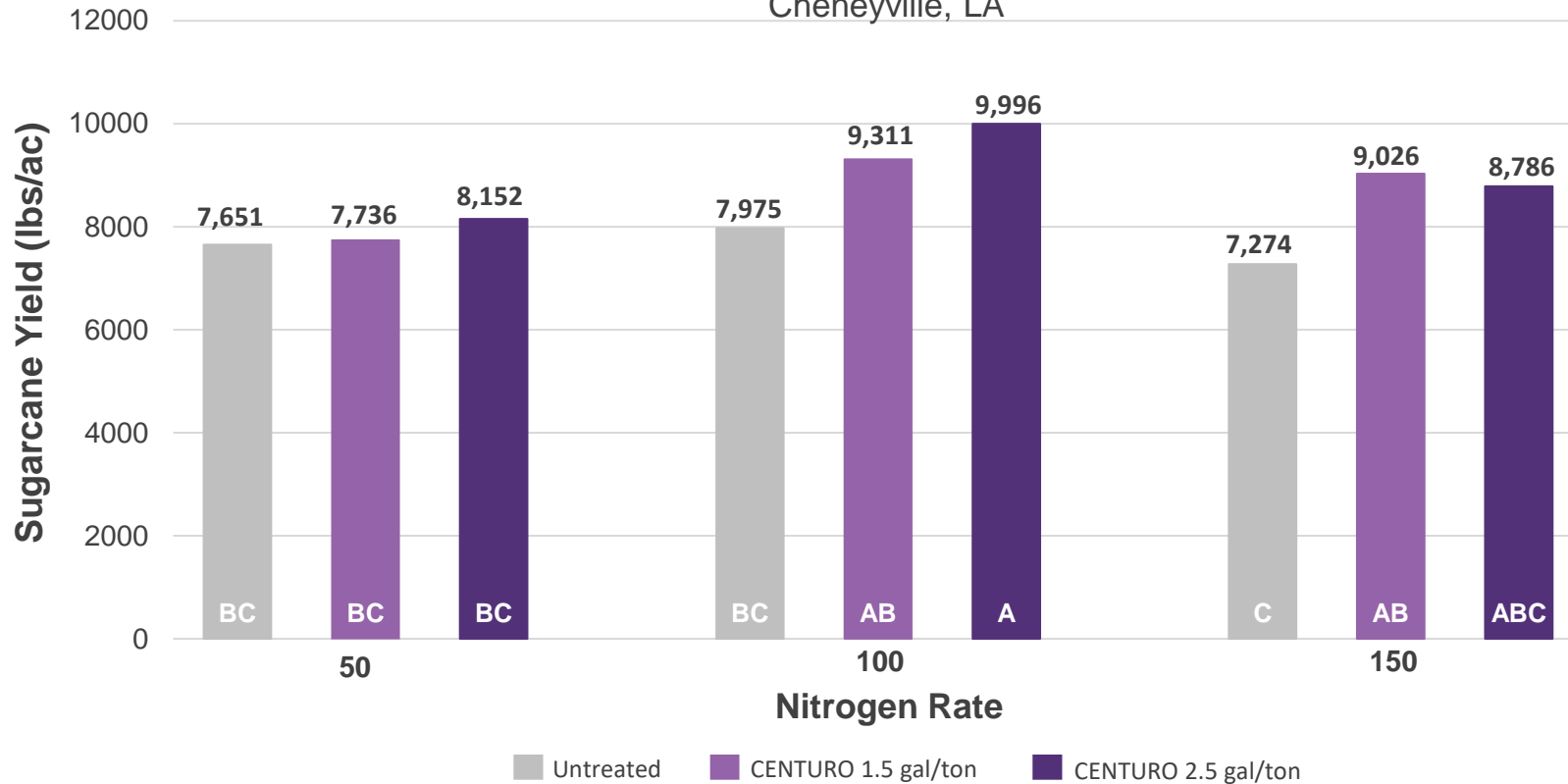
Potential loss of nitrogen via denitrification for soil temperature and time in anaerobic conditions: Nutrient Management for Agronomic Crops in Nebraska

Time	Temperature	Nitrogen Loss
Days	°F	%
5	55-60	10
10	55-60	25
3	75-80	60

- Rule of thumb: Denitrification losses range **2-3%** per day at soil temperatures from 55-65°F or **4-5%** per day if soil temperatures exceed 65°F.

CENTURO[®] Sugarcane Yield Advantage

2020 Spring Sugarcane Trials
Third Ratoon Crop
 Cheneyville, LA



Bars with same letter are not significantly different $p > 0.20$

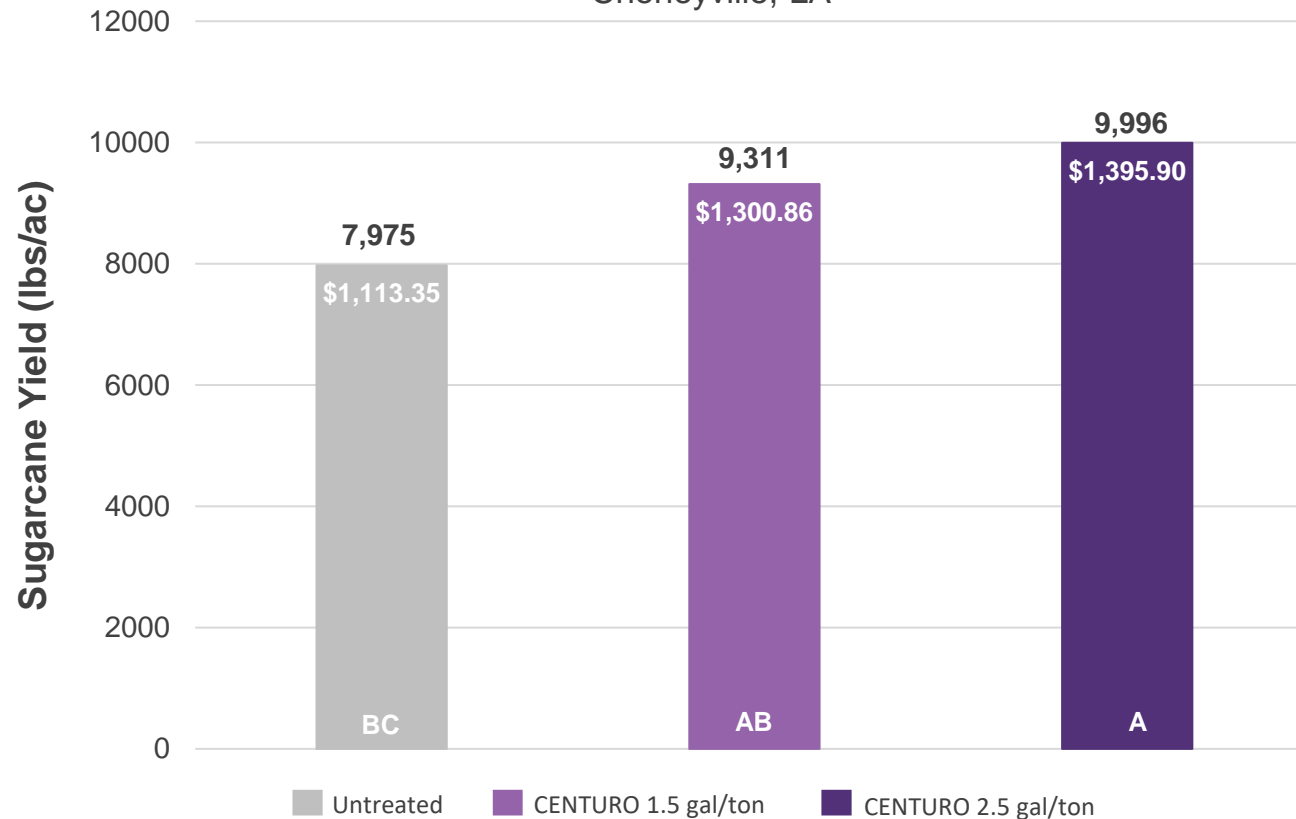
The underlying data was provided by Pest Management Enterprises under a Research Trial Financial Support Agreement with Koch Agronomic Services, LLC. Neither these institutions, nor the individual researchers referenced, endorse or recommend any product or service. Improvements in yield and nutrient use efficiency may not be observed in all cases. CENTURO is not registered for sale or use in all states. Contact your state pesticide regulatory agency to determine if a product is registered for sale or use in your state. Always read and follow label instructions.

- A 2020 Louisiana study in UAN showed both 1.5 gal/ton and 2.5 gal/ton rates of CENTURO resulted in higher sugarcane yields compared to untreated UAN at all three nitrogen rates (50, 100 & 150 lbs N/ac) although yield was optimized at the 100 lbs N/ac rate.
- Both 1.5 gal/ton and 2.5 gal/ton rates of CENTURO at 100 lbs N/ac had a significant sugarcane yield advantage compared to untreated UAN of 1,336 lbs/ac and 2,021 lbs/ac respectively.
- Pronitridine, the active ingredient found in CENTURO, is recognized as an enhanced efficiency fertilizer for an enhancement activity by the Louisiana Conservation Stewardship Program (CSP).

- Application Date: April 7, 2020; side dress injected
- Soil series: Coushatta
- Texture: Silt loam
- Soil pH: 8.0
- O.M.: 1.2%
- CEC: 11.7
- Precipitation: Rainfall between nitrogen application and harvest was 42.4 inches

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- CENTURO at 1.5 gal/ton at 100 lbs N/ac rate resulted in increased net revenue of \$187.51 per ac compared to untreated UAN.
- CENTURO at 2.5 gal/ton at 100 lbs N/ac rate resulted in increased net revenue of \$282.55 per ac compared to untreated UAN.
- Pronitridine, the active ingredient found in CENTURO, is recognized as an enhanced efficiency fertilizer for an enhancement activity by the Louisiana Conservation Stewardship Program (CSP).
- Values are for demonstrative purposes only. The price of CENTURO per gallon and acre may vary. Grower price is set at the sole discretion of the retailer. In this example, the following assumptions are made: The price to producer of sugar per lbs. is \$0.145 and the price per gal of CENTURO is \$27.

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The image features a background of a cornfield at sunset. The sky is a mix of orange, yellow, and blue, with some clouds. In the foreground, there are rows of green corn plants. The Koch logo, a stylized 'K' inside a square, is positioned to the left of the word 'KOCH'. A horizontal line is drawn below the word 'KOCH'.

K KOCH™

AGRONOMIC SERVICES

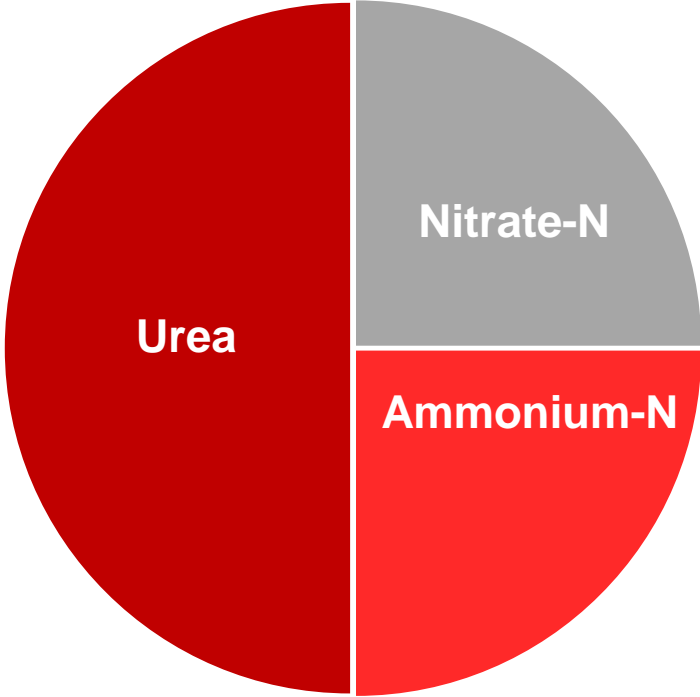
The data and material contained herein are provided for informational purposes only. No warranty, express or implied, is made including, but not limited to, implied warranties of merchantability and fitness for a particular purpose, which are specifically excluded. Results may vary based on a number of factors, including environmental conditions. Improvements in yield, nutrient use efficiency and nitrate leaching may not be observed in all cases. Before use, consult the product packaging and labeling for information regarding the product's characteristics, uses, safety, efficacy, hazards and health effects.

Always read and follow label instructions.

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UAN-32: Loss Risk Profile

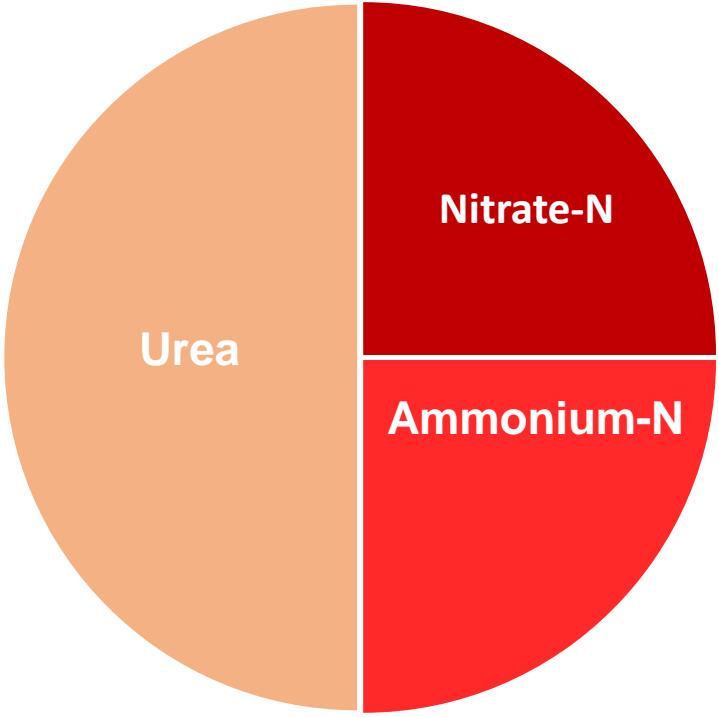
Volatilization Risk When Applying UAN



■ None ■ Medium ■ High

75%

Leaching & Denitrification Risk When Applying UAN¹



■ High ■ Medium ■ Low

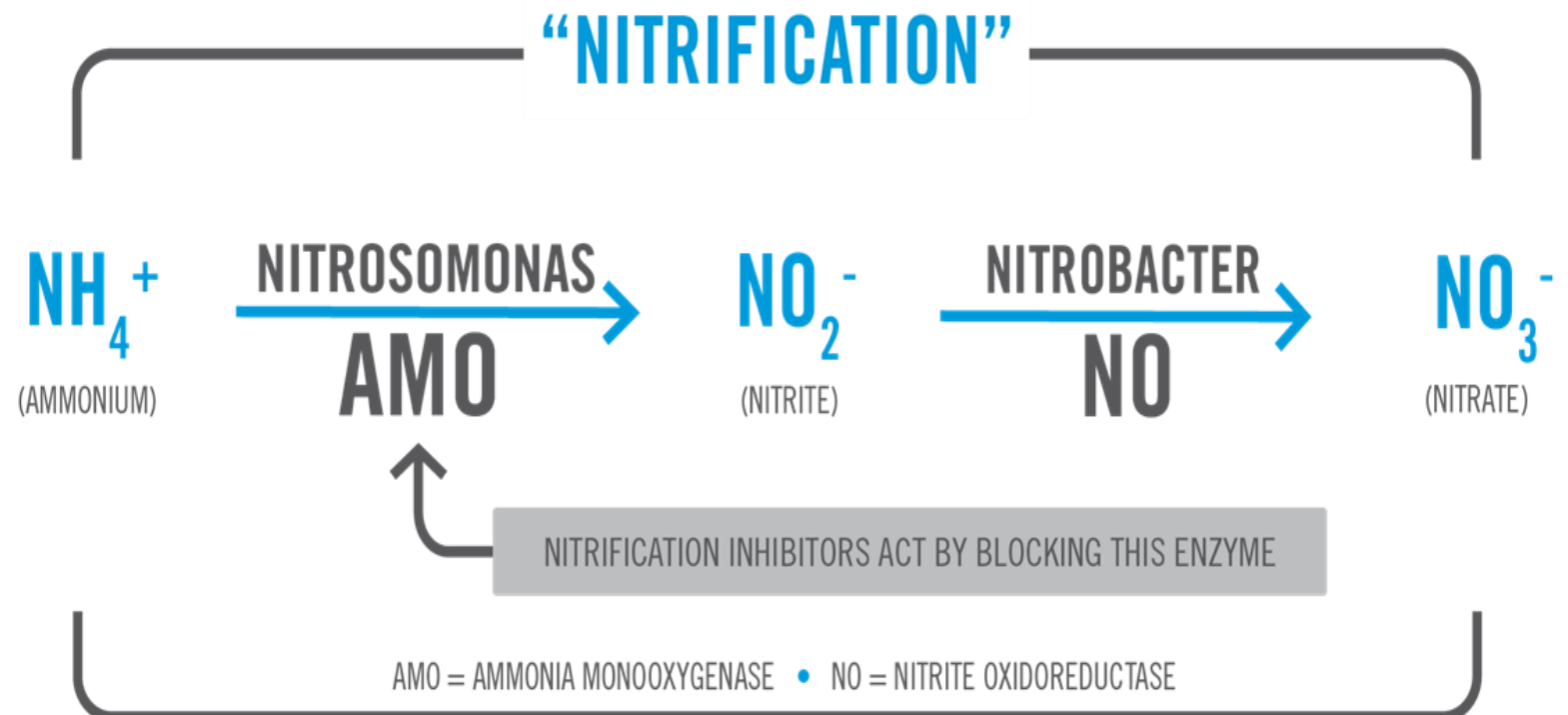
100%

¹This risk profile is at the time of application. If excess moisture was to occur within three weeks after application this can put 100% of UAN at high risk to denitrification and leaching losses.

Understanding nitrification

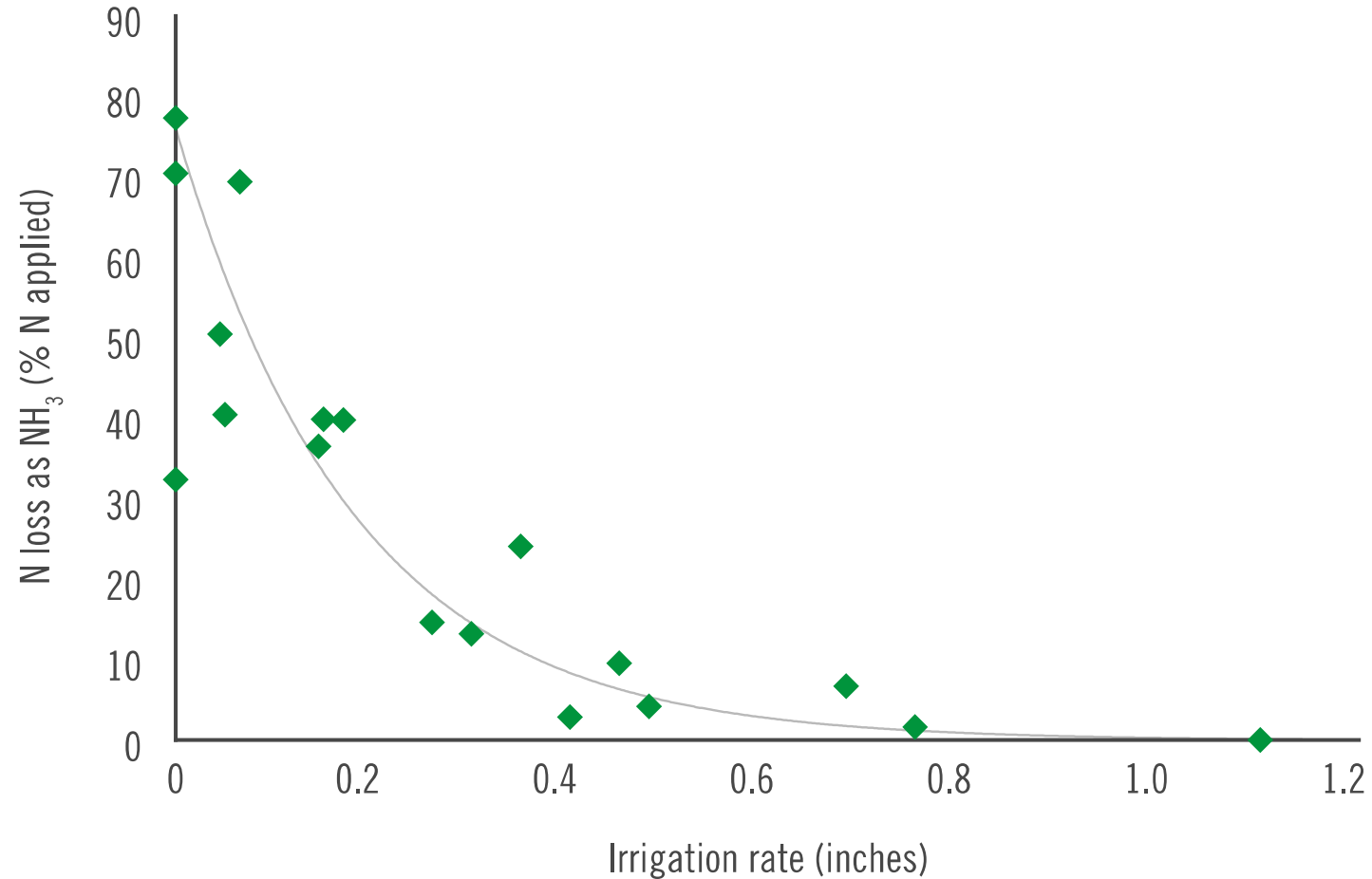
Nitrification Factors¹:

- **Oxygen/Moisture:** Requires oxygen. Rate restricted at 60% water-filled pore space.
- **Temperature:** Rate increases with temperature, not limited above 75F.
- **Soil pH:** Optimum 6.5 to 8.0
- **Soil Properties:** Nitrifying bacteria thrive under higher clay content and OM.
- **Ammonia:** High concentrations in bands can inhibit nitrifying bacteria.
- **Tillage:** Rates higher in no-till and reduced till than conventional till.



¹Source: [http://www.ipni.net/publication/nitrogen-en.nsf/0/7F7F448C4D064A5985257C13004C83A3/\\$FILE/NitrogenNotes-EN-04.pdf](http://www.ipni.net/publication/nitrogen-en.nsf/0/7F7F448C4D064A5985257C13004C83A3/$FILE/NitrogenNotes-EN-04.pdf)

How much rain to incorporate urea?



- Field study
- Average study temperature:
- Adkins fine sandy loam
- Nitrogen rate: 100lbs N/acre
- Source: Horneck, 2010. Oregon State University.

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