



Nitrogen Stabilization

Greg Binford

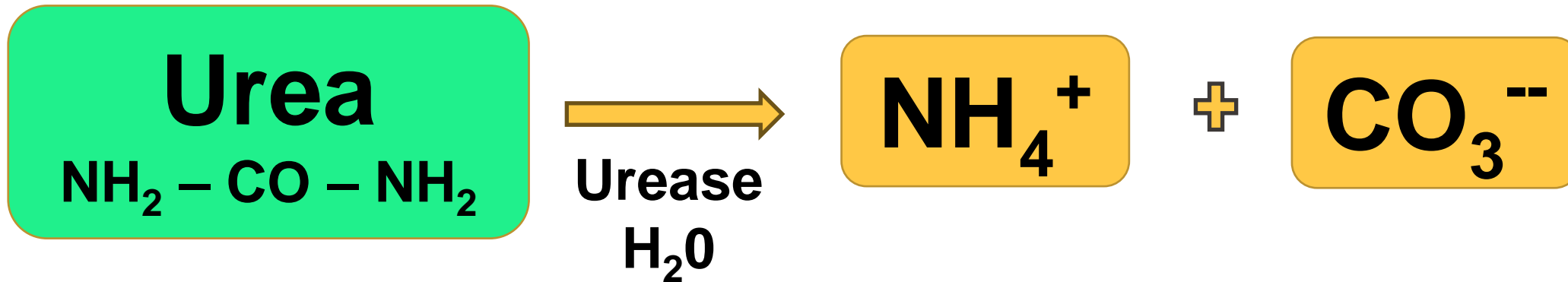
Director of Advanced Agronomy

**ADVANCED AGRONOMY
BOOTCAMP**

NITROGEN



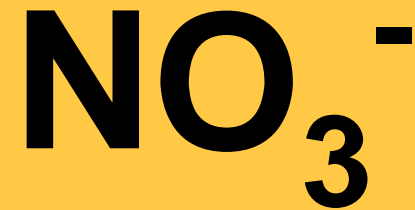
What Happens to N Fertilizer?



Plant Available Forms of N?



Ammonium



Nitrate

Main N form Taken up by Plants?



Nitrate

WHY?

NITRIFICATION



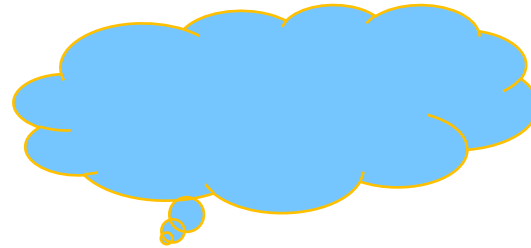
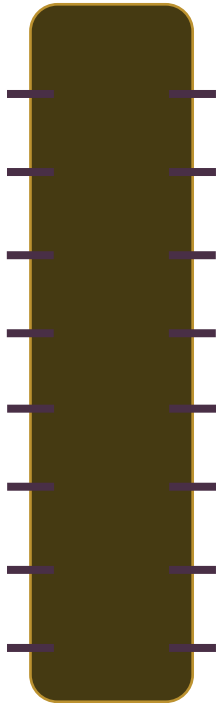
Fate of NITRATE in Soils

- Utilized by plants
- Can accumulate in the soil as nitrate
- Lost from soil via LEACHING
- Lost from soil via Denitrification

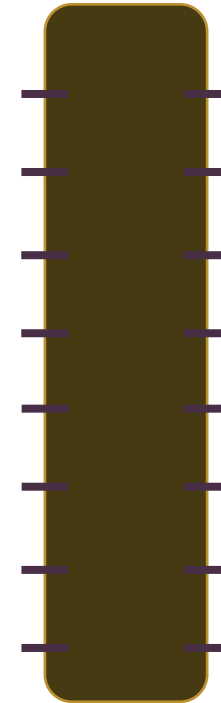


LEACHING Process

Clay or O.M.
particle



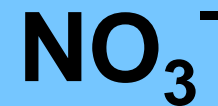
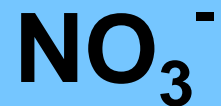
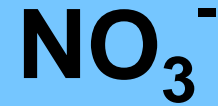
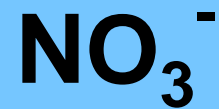
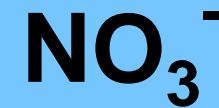
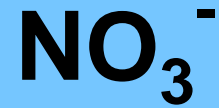
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particle



Denitrification Process

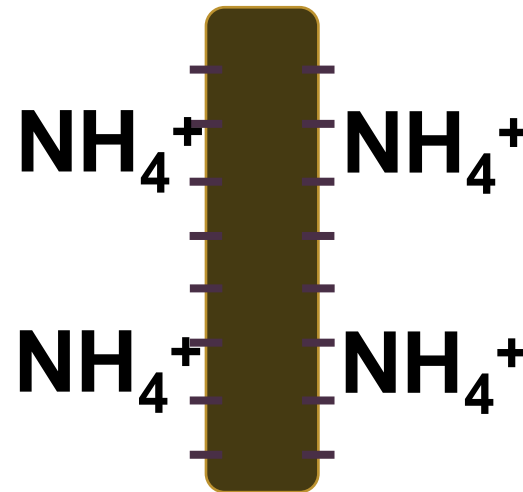
Clay or O.M.
particle

Clay or O.M.
particle



Denitrification Process

Wet Conditions & soil pores filled with water



Fate of Ammonium Soils

- Utilized by plants
- Converts to nitrate in soils quickly
- Because of “Nitrification”
- Lost from soil via Volatilization

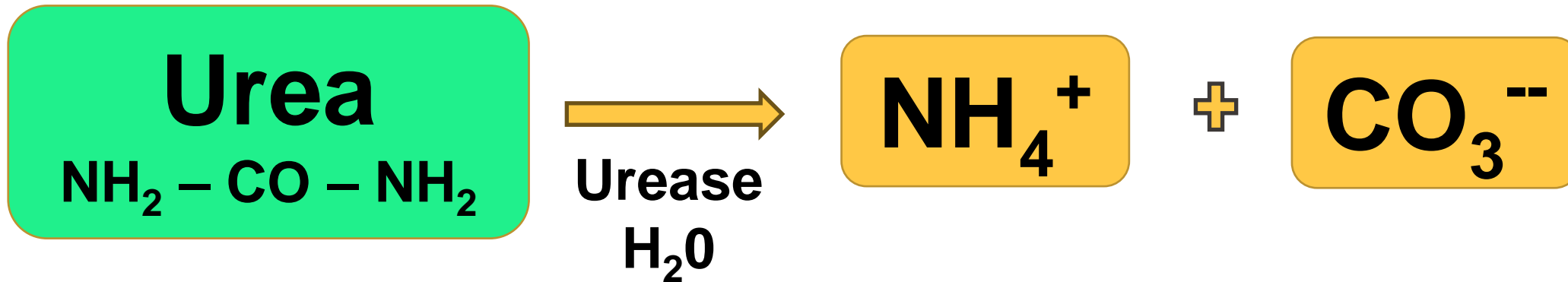


Volatilization Process

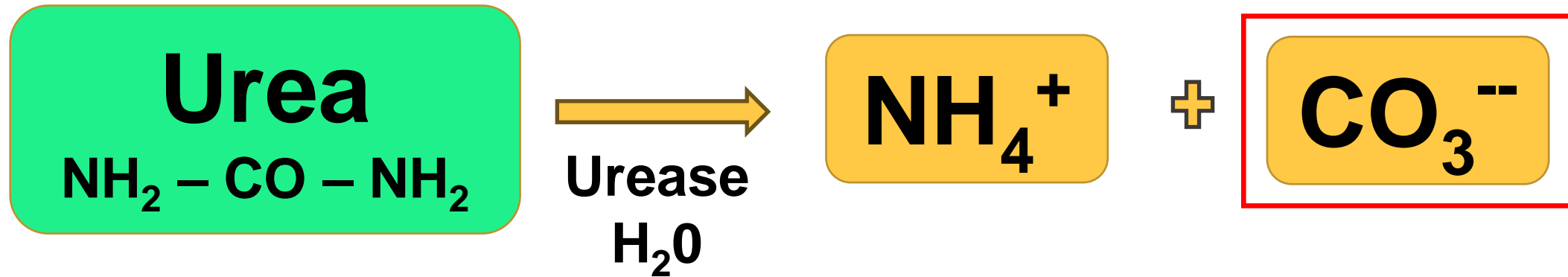
- Loss of ammonium ions into the atmosphere
- NH_4^+ converts to NH_3 as pH increases



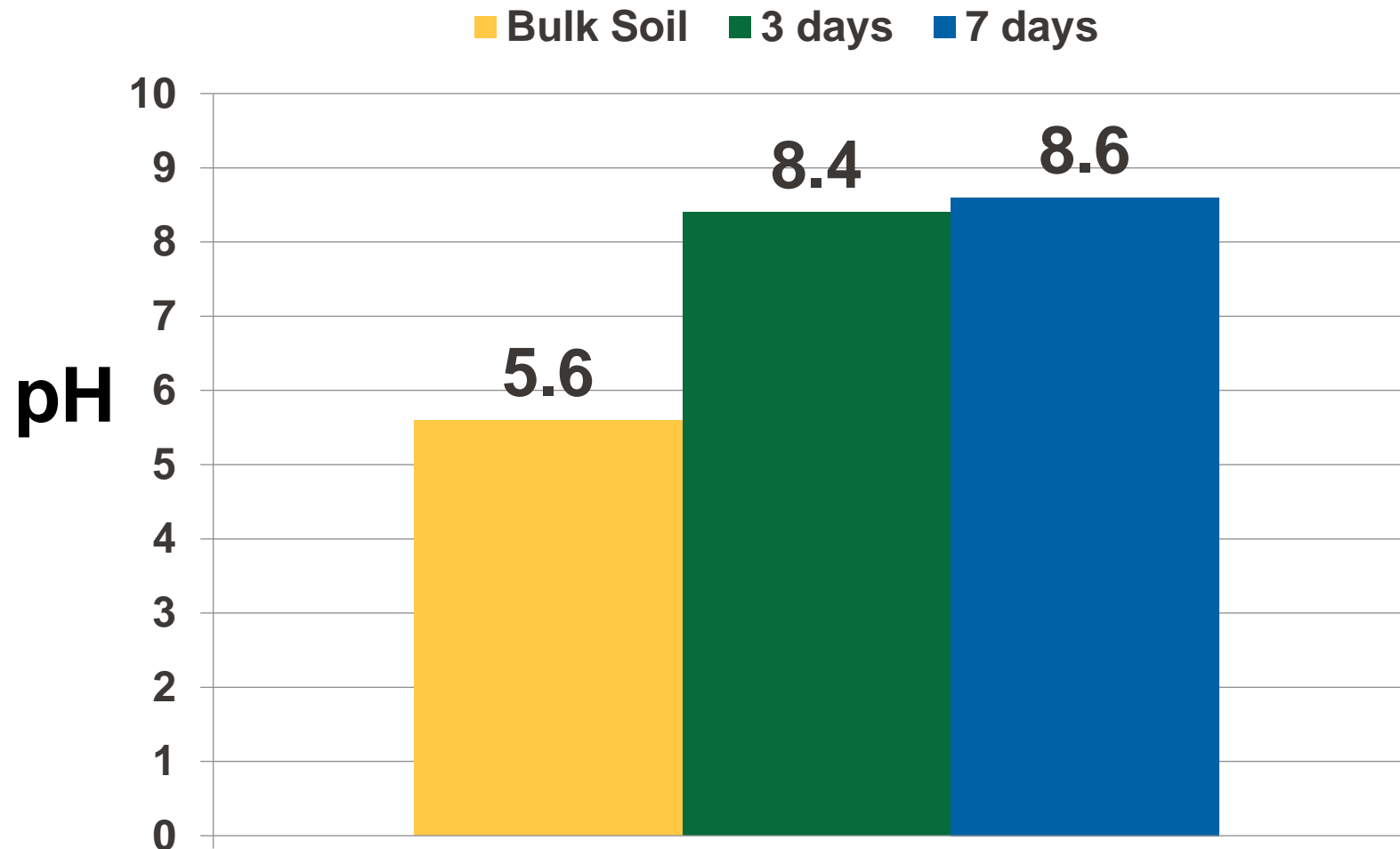
What Happens to N Fertilizer?



What Happens to N Fertilizer?



Why is UREA different?

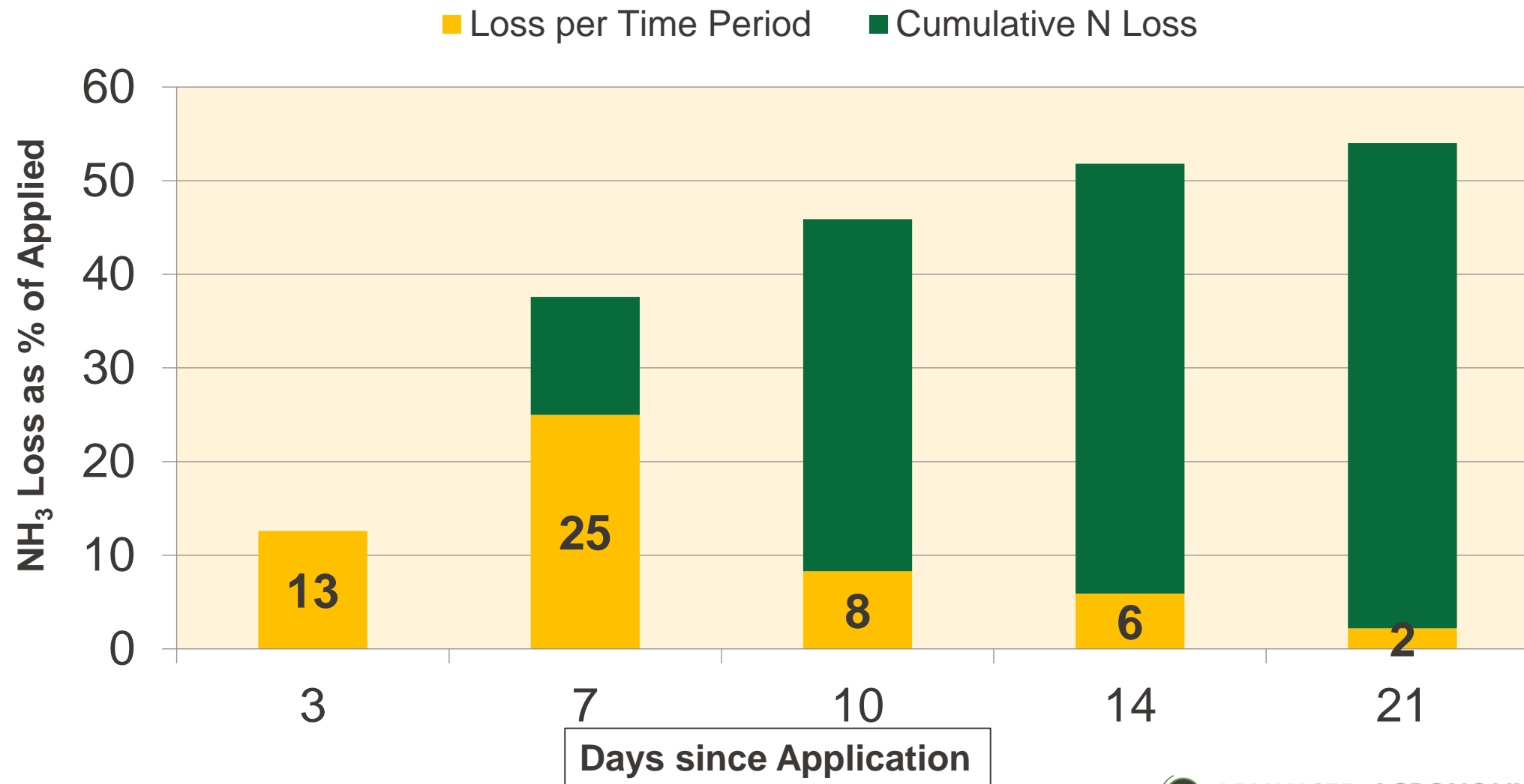


Volatilization Process

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Urea Volatilization vs. Time



“The Challenge” – Managing N in a Leaky System



“Solution” to Reducing Nitrogen Loss Potential



Potential Solutions

- Split-Apply or spoon-feed crop
- Nitrification Inhibitors (Leaching & Denitrification)
- Urease Inhibitors (Ammonia Volatilization)
- Slow-Release products
- Combination of multiple solutions

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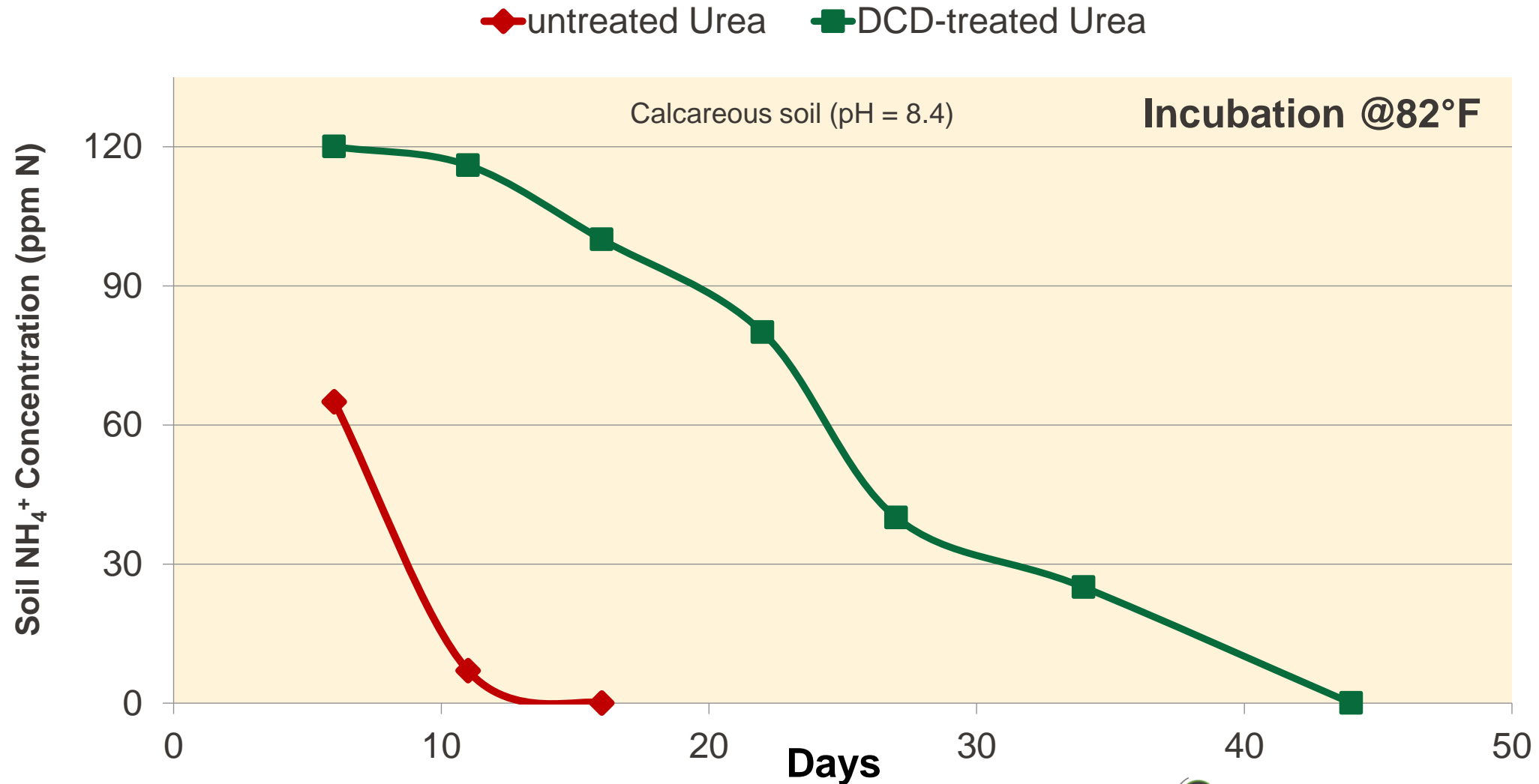
NITRIFICATION Inhibitors



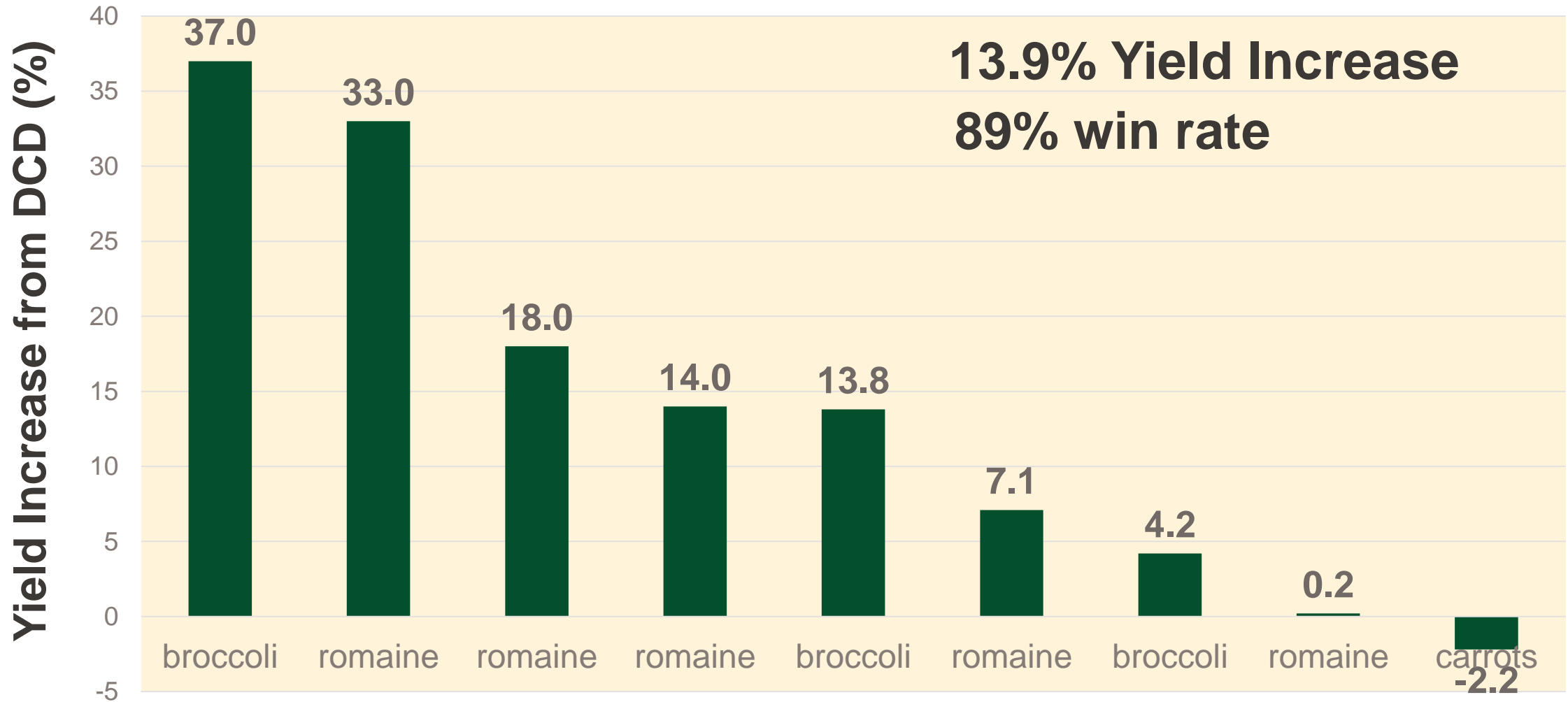


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- **DCD (DiCyanDiamide)**
 - **Nitrification Inhibitor**
 - **NH₄⁺ nutrition**
 - **Plant available**
 - **Protected from leaching & denitrification**

Effect of DCD on Nitrification



Yield Increase from DCD



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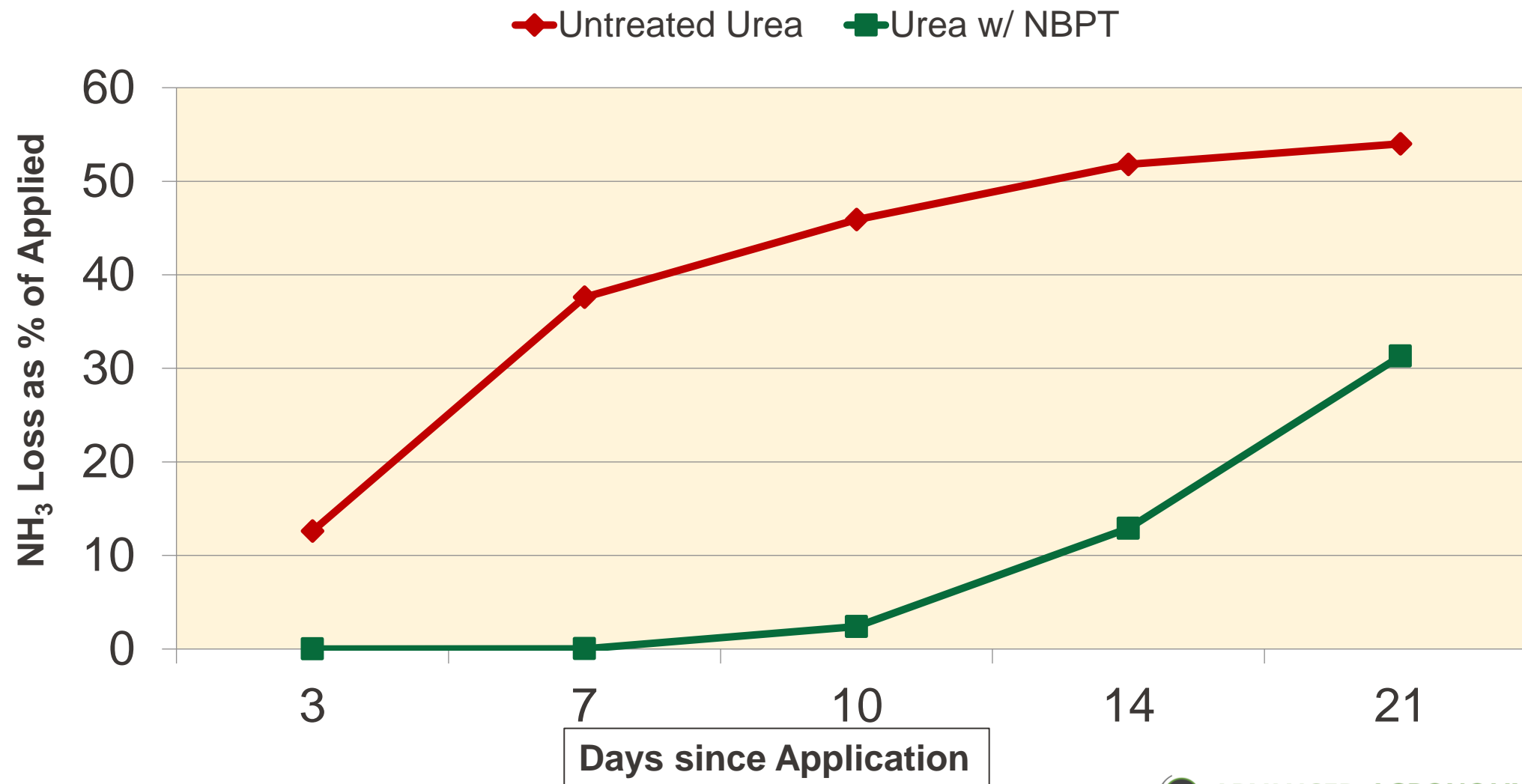


Potential Solutions

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Impact of NBPT on Volatility





- **NBPT**
- **Urease Inhibitor**
- **Prevents N volatilization**
- **Superb solvent system**
- **Lower rate per ton**



NDURE[®]
TRIPLE



- **NBPT + DCD**
- **Urease Inhibitor**
- **Nitrification Inhibitor**
- **Reduced volatilization**
- **Reduced leaching**
- **Reduced denitrification**





GUARANTEED ANALYSIS

Total Nitrogen (N)27.00%

6.00% Ammoniacal Nitrogen*

6.00% Nitrate Nitrogen

15.00% Urea Nitrogen*

Derived from Urea Ammonium Nitrate.

*21.00% Nitrogen stabilized with dicyandiamide (DCD) (CAS 461-58-5).

ALSO CONTAINS NON-PLANT FOOD INGREDIENT:

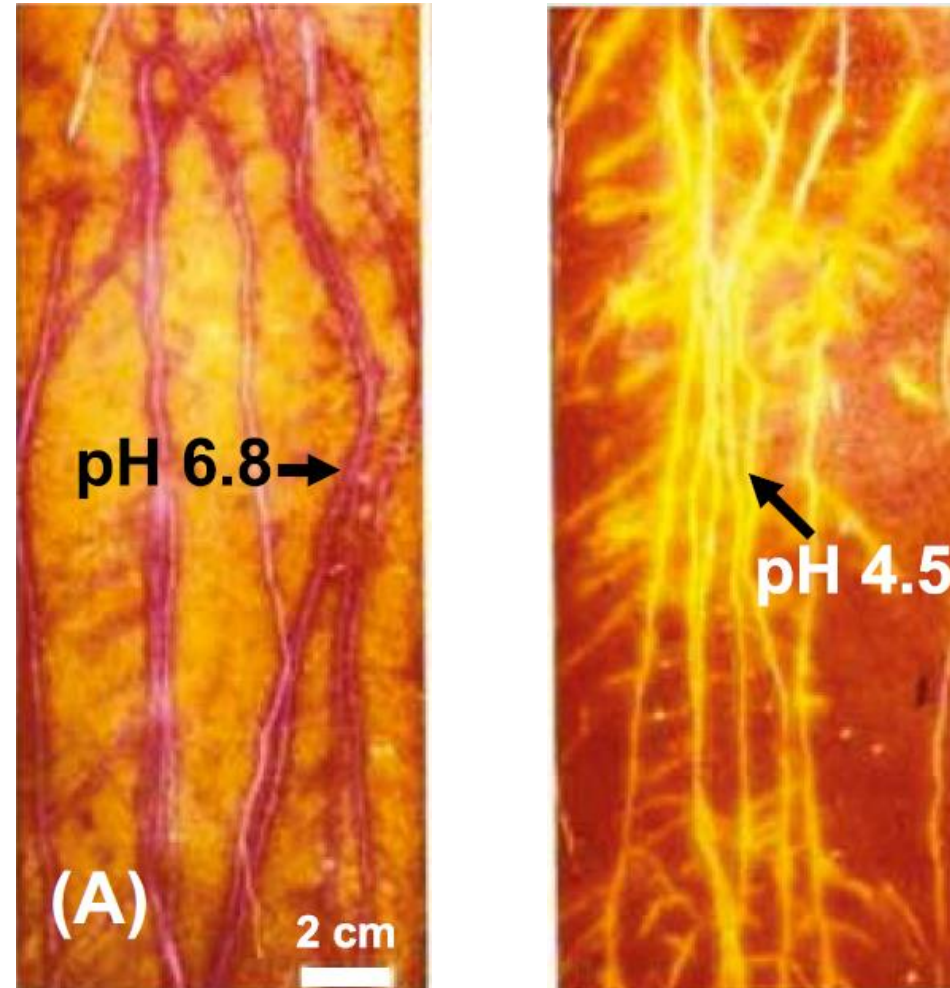
0.08% Humic Acids derived from Leonardite.

- Reduces potential for leaching (DCD)
- Reduces potential for denitrification (DCD)
- Longer lasting ammonium nutrition
- Includes PURIC Technology
- Improved Nutrient-Use Efficiency

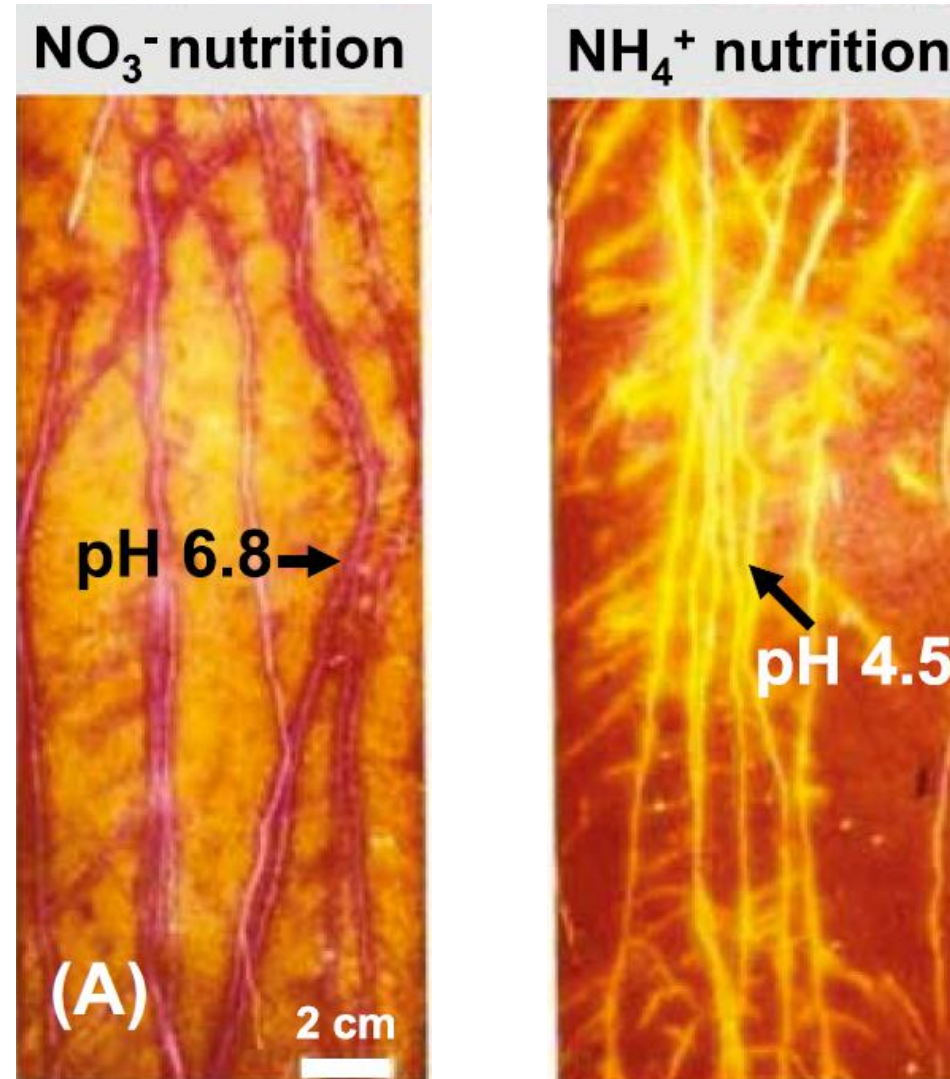
Benefits of Ammonium Nutrition

- NH_4^+ metabolism = less energy use
- NH_4^+ uptake = H^+ release from root
- H^+ release = changes pH of rhizosphere

Nutrient Uptake vs. Rhizosphere pH



Nutrient Uptake vs. Rhizosphere pH

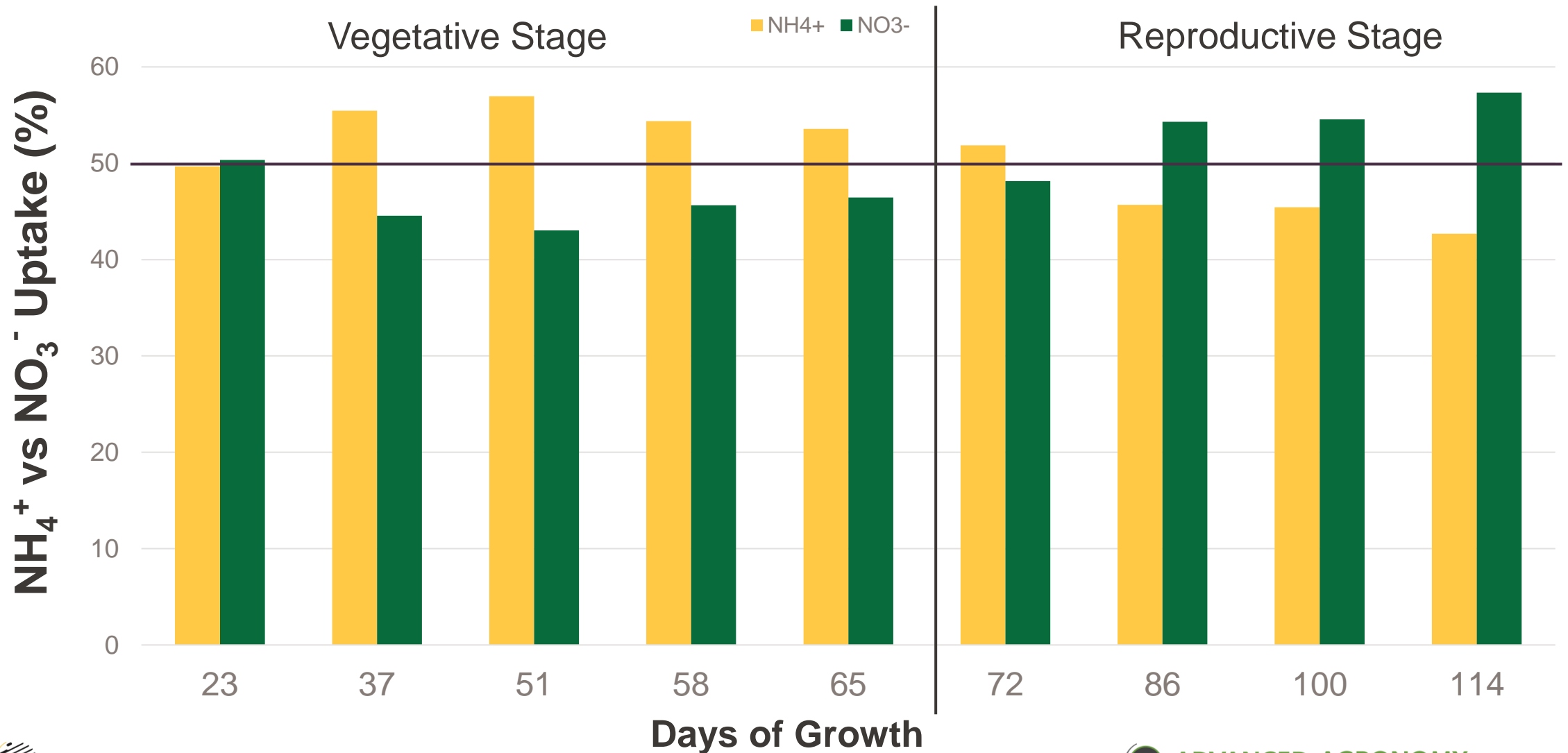


Benefits of Ammonium Nutrition

- NH_4^+ metabolism = less energy use
- NH_4^+ uptake = H^+ release from root
- H^+ release = changes pH of rhizosphere
- Alkaline soils = P, Zn, etc. more available
- Most plants benefit from some NH_4^+
- DCD maintains NH_4^+ longer in the soil

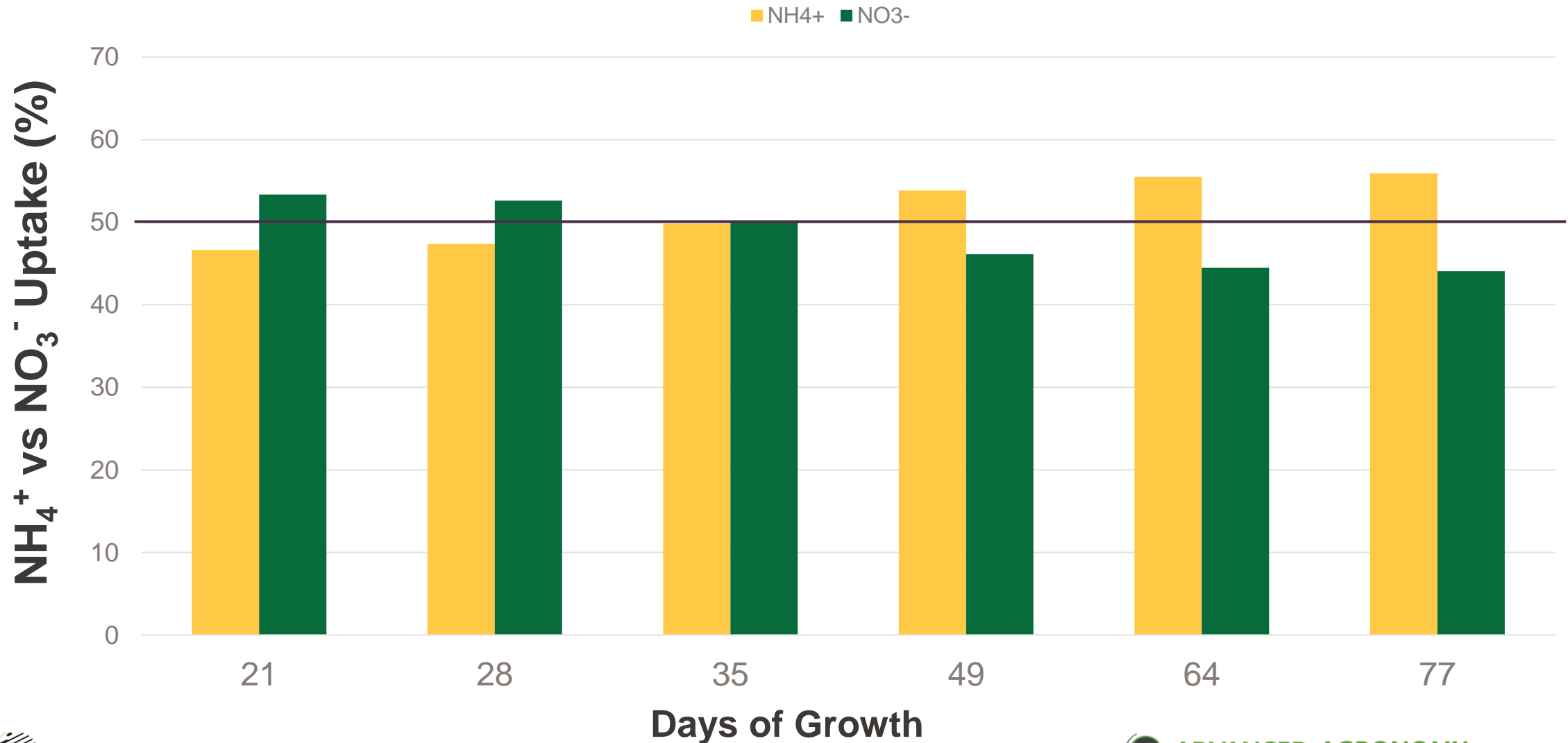
NH_4^+ & NO_3^- Uptake by Corn

Solution cultures with equal amounts of NH_4^+ & NO_3^-



NH_4^+ & NO_3^- Uptake by Buckwheat

Solution cultures with equal amounts of NH_4^+ & NO_3^-



Till-It N-POWER Responses – Why?

- Reduced leaching (DCD)
- Reduced denitrification (DCD)
- Increased root growth (Puric)
- Better microbial activity (Puric)
- Preferred nitrate:ammonium ratio
- Increase nutrient availability (NH_4^+ uptake)





Features & Benefits

ADVANCED AGRONOMY
BOOTCAMP



TILL IT N-POWER

Nutrients Plants Crave
Maximize The Power of N

What is it?

- Stabilized nitrogen source coupled with nutrient holding capacity
- Loaded with NDure DCD to slow nitrification and reduce leaching potential
- Contains nutrient use efficiency power of Puric Humic Acid

Benefits

- 1 Protects nitrogen investment from nitrification and leaching
- 2 Increased efficiency of nitrogen may lead to less inputs and improved Yield and Quality
- 3 Increased nutrient uptake and water holding capacity

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Questions

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