Evaluation of 4R’s N management for Canola

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Washington State University

REACHCH Regional Approaches to Climate Change - Pacific Northwest Agriculture
Best Management Practices for Mitigating and Adapting to Climate Change (cfBMPs)

- Nitrogen Management
- Crop Diversification and Intensification
“Canola is not your father’s wheat”
Canola: Tap Rooted Crop
Wheat: Fibrous Rooted Crop
Starter Fertilizer
Previous Research
Root Urea Interactions

Root Depth Response To Increased Urea

Depth of tap root Apex (mm)

Urea Rate (mg N cm⁻¹)

Isaac J. Madsen
My Research Objective

- Urea
- Ammonium Sulfate
- Urea Ammonium Nitrate
- Ammonium Polyphosphate 11-37-0
Methods
Experiment Setup

Seed Placement
N Source Placement

Light Source
#1 #2 #3 #4
N Source Gradients

0 5 10 15 20 30 40
(mg N cm⁻¹)
Results
Effective Dose Response

- Percentile = % Root Depth Reduction
- ED = Effective Does Rate to reach (X)% root depth reduction

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<td>0.8</td>
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<tr>
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• Was there a difference in ammonium/ammonia toxicity threshold for the various sources

• Which source exhibited the highest toxicity levels

• Which source Exhibited the lowest toxicity levels

• What caused the differences in toxicity levels

• Future Research
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Chemical Composition

Urea
CO(NH$_2$)$_2$
46-00-00

Urea Ammonium Nitrate
AN(NH$_4$NO$_3$)
32-00-00

Ammonium Sulfate
(NH$_4$)$_2$SO$_4$
21-00-00

Ammonium Polyphosphate
(NH$_4$PO$_3$)$_n$
11-37-0
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Conclusion
“Canola is not your father’s wheat”
Relative Toxicity

- Urea
- Ammonium Sulfate
- Urea Ammonium Nitrate
- Ammonium Polyphosphate (11-37-0)
Right Source

= Urea
= Ammonium Nitrate

Right Rate

= (10-15mg N cm\(^{-1}\))
Questions