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Manitoba Agriculture and Resource Development

Farm-scale Research on Stabilization of Fall Anhydrous Ammonia in Manitoba

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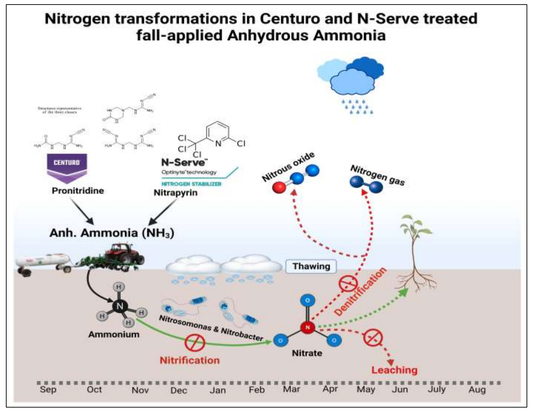

INTRODUCTION

- Farmers in MB commonly apply anhydrous ammonia (82-0-0) in the fall, but this practice can result in N losses.
- Nitrification in the soil is a key factor influencing N losses.
- Use of nitrification Inhibitors (NIs) is a viable option to mitigate fall N losses.

OBJECTIVES

- Do Centuro and N-Serve with fall-applied AA can slow down the nitrification.
- Do use of NIs with fall-applied AA can impact crops yield and N uptake under commercial scale.

FIELDS SETUP

- Two farm-scale research trials were conducted in 2021-22 at Notre Dame (ND), and Manitou (MN) sites following a RCBD with five treatments and four replicate strips.
- Nitrogen was applied in October at ND and MN sites, at 80% of the recommended rate with and without Centuro (@ 21 L metric tonne^{-1} N) and N-Serve (@ 0.95 L ac^{-1}), while the treatments without N addition (Control) and with full N rate were included.
- Soil (0-12") on and between the NH_3-banded rows was sampled during late fall, early and late spring for both sites, and was extracted for NH_4^+-N and NO_3^--N conc.

RESULTS

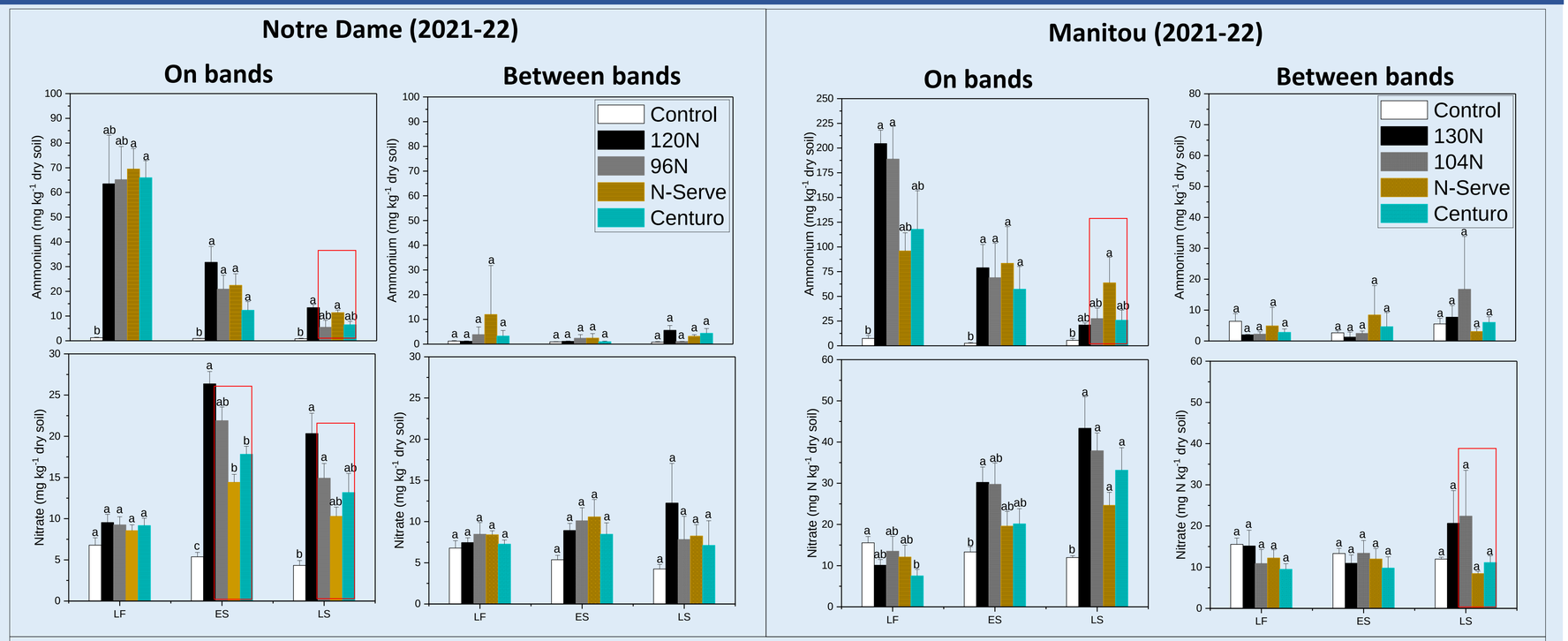

Fig 1. Effect of N-Serve and Centuro on soil (0-30 cm) ammonium (NH_4^+-N) and nitrate (NO_3^--N) concentrations in the NH_3 banded rows and between the bands during late fall (LF), early spring (ES), and late spring (LS) at Notre Dame 2021-22 and Manitou 2021-22. Means with different letters within a sampling time are significantly different at $\alpha = 0.05$ according to Tukey's multiple comparison procedure. Error bars indicate standard errors of the means (n=4).

CONCLUSIONS

- Use of NIs increased an average NH_4^+-N retention within the bands until late spring (8.9 and 51.4 mg kg^{-1} dry soil) compared to untreated NH_3 (5.5, and 32.1 mg kg^{-1} dry soil) at ND and MN sites, respectively.
- NIs led to a reduction in NO_3^--N accumulation between the bands until late spring (8.4 and 9.8 kg^{-1} dry soil) compared to untreated NH_3 (8.7 and 22.4 kg^{-1} dry soil) at ND and MN sites, respectively.
- No notable differences in agronomic yield and N uptake were observed between N treatments.

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References

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