

Introduction

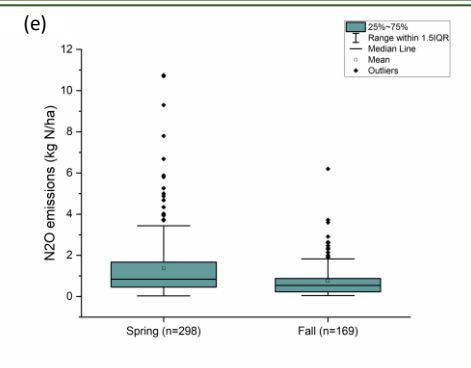
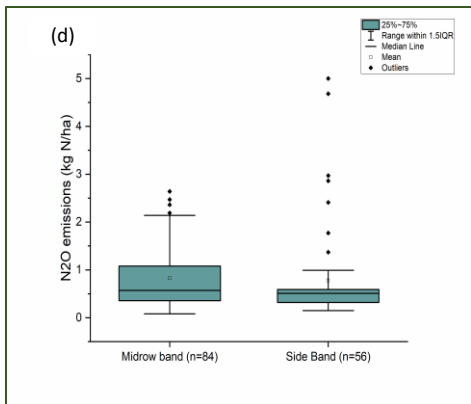
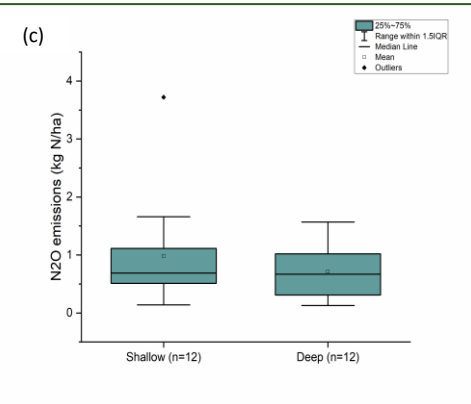
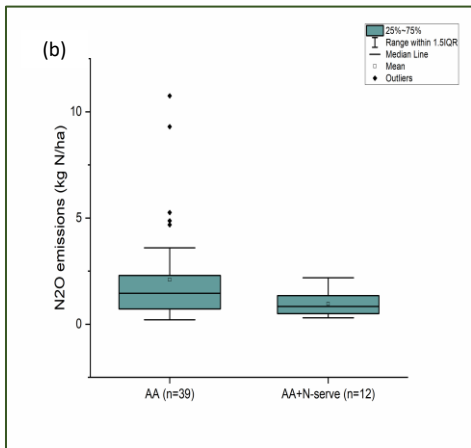
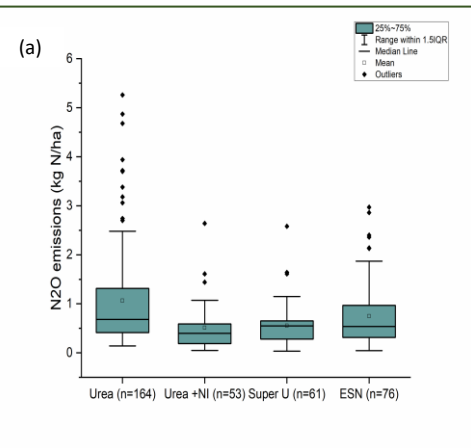
- Nitrous oxide has global warming potential of ~300 times that of CO₂
- In Canada, agricultural N₂O emissions account for 71% of total emissions
- Use of 4R Nutrient Stewardship i.e., application of right source at right time, right rate, and place is an effective way to reduce N₂O emissions
- Enhanced efficiency fertilizers (EEFs) with nitrification inhibitors (NI) have the potential to reduce losses
- Banding fertilizers minimizes toxicity risk and losses

Objective

- To quantify the 4Rs impact on N₂O emission mitigation and crop yield across regions with cold climates

Methodology

- Data were collected from field experiments conducted in Western Canada and regions with similar climatic conditions
- Experiments with replicates were considered
- Statistical analysis was done in R



Cumulative N₂O emissions from:
Fig a: Urea, Urea + NI (Nitrapyrin, eNtrench, Instinct), Super U (DCD+NBPT), and ESN; **Fig b:** Anhydrous Ammonia, Anhydrous Ammonia + NI(N-serve); **Fig c:** Shallow and Deep band placement; **Fig d:** Midrow band placement and side band placement; **Fig e:** Spring and Fall season
 *n= number of observations

Preliminary Result

- Application of NI, Super U and ESN reduced N₂O emissions by 52% (p<0.0008); 48% (p<0.001) and 30% (p=0.03).
- N-serve did not reduce N₂O emissions from anhydrous ammonia application (p=0.09).
- Depth of banding did not show a significant (p=0.39) impact on N₂O emissions.
- There was no significant difference between side band compared to midrow band placement (p=0.71).
- Fall application resulted in significantly low emissions than spring application (p<0.001).

Conclusion

Of the reviewed and sorted datasets, the use of 4R's can have a great potential to reduce N₂O emissions. Use of EEFs, especially those with inhibitors effectively reduced emissions.

Acknowledgement

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