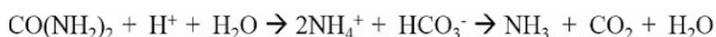
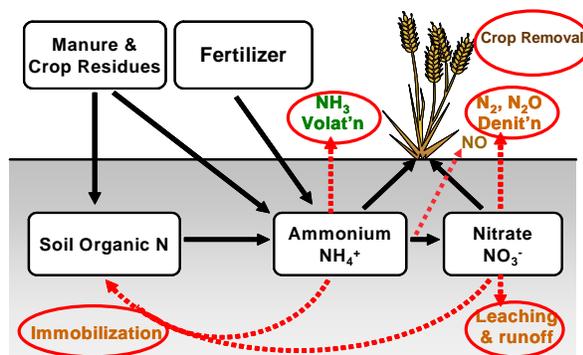


# Station 5: Ammonia – It's Also a Gas

## 2020 MSSS Drop-in Tour — 4R Canola N Management



Passive colorimetric dosimeter tubes for measuring NH<sub>3</sub> emissions

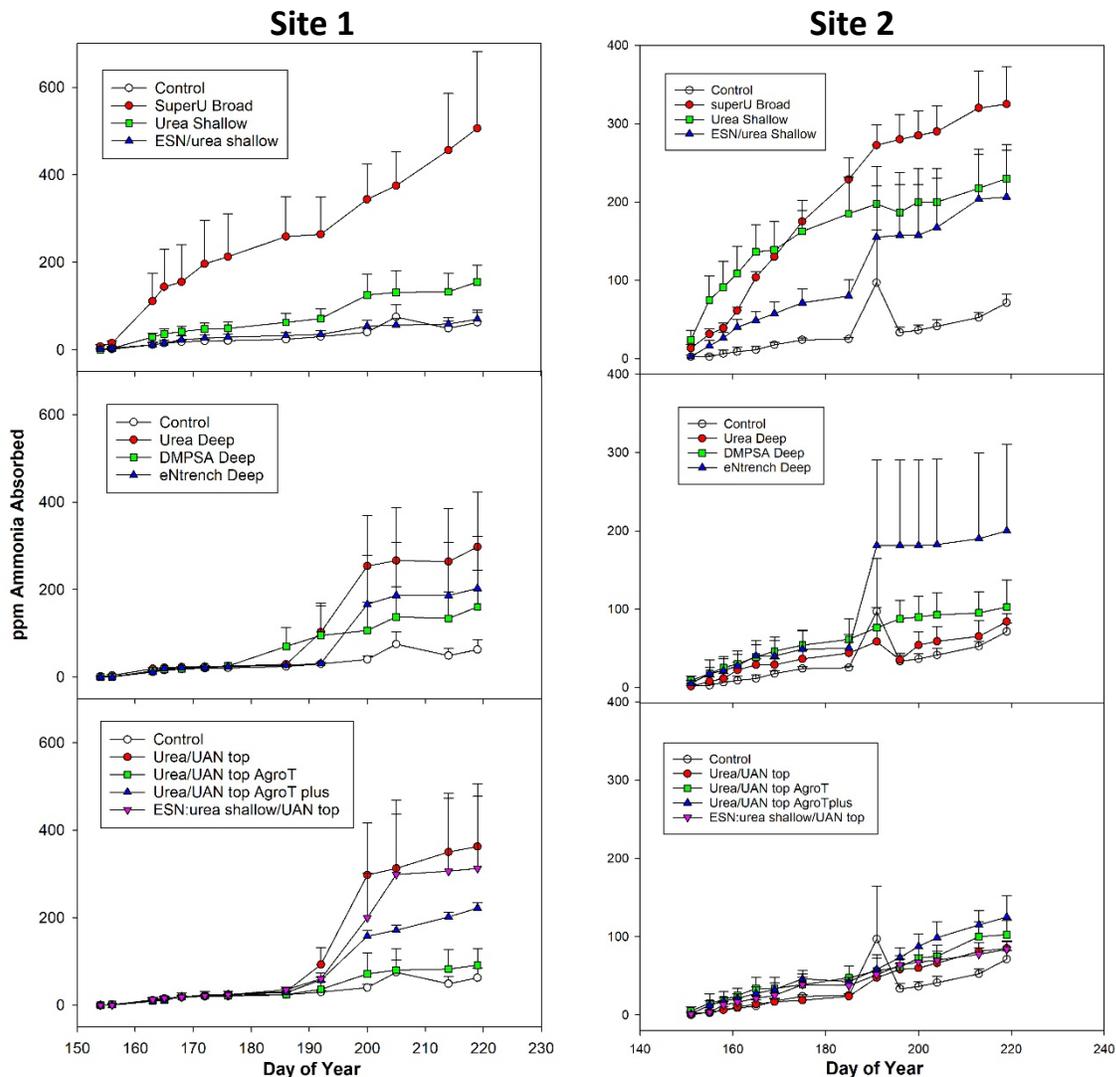


**NH<sub>4</sub><sup>+</sup>-based fertilizers are prone to loss vis NH<sub>3</sub> volatilization**

- ✿ Ammonia (NH<sub>3</sub>) volatilization is a significant loss pathway of NH<sub>4</sub><sup>+</sup>-based fertilizers such as urea. It can be a costly loss for farmers; 10-50 lbs N/ac. It occurs when urea hydrolysis elevates pH levels and increases the concentration of gaseous NH<sub>3</sub> around granules.
- ✿ The project tested the “4R” combinations of integrated best management practices by answering three questions:
  - 1) Can SuperU broadcast or ESN/Urea blend shallow banded applications reduce NH<sub>3</sub> emissions, compared to urea shallow banded?
  - 2) Can new inhibitor products (DMPSA and eNtrench) reduce emissions when urea is deep banded?
  - 3) Can urease and nitrification inhibitor products (AgroT and AgroT plus) reduce emissions for in-season UAN application?
- ✿ NH<sub>3</sub> fluxes were monitored at two sites near St. Claude in MB throughout the growing season of 2019. The selected treatments included the 0N check and among the spring 1xN treatments (figure next page).

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## 2020 MSSS Drop-in Tour — 4R Canola N Management



- Ammonia Absorbed (ppm) are presented as three panels in the figures. The top panel has SuperU Broadcast Surface, urea shallow banded and ESN:urea shallow banded treatments. The middle panel shows the urea, DMPSA and eNtrench deep banded treatments. The bottom panel shows the split applications of UAN, UAN/AgroT or UAN/AgroT plus top dressed (streamed).
- At both sites, SuperU surface broadcast had the most  $\text{NH}_3$  volatilization loss (top panels). ESN/Urea blend shallow banded treatment had the lowest, confirming the benefit of banding polymer-coated urea in reducing  $\text{NH}_3$  losses from canola fields with light texture soil.
- When urea was deep banded, use of nitrification inhibitors DMPSA and eNtrench reduced  $\text{NH}_3$  volatilization at site 1, but rather increased  $\text{NH}_3$  volatilization at site 2. More analysis are needed to understand why the nitrification inhibitors acted differently.
- Treatment effect of urease/nitrification inhibitor products for in-season UAN application also varied with sites. At site 1, both AgroTain and AgroTain Plus decreased  $\text{NH}_3$  loss. Contrary results were observed at site 2.