

# A field study linking soil N<sub>2</sub>O concentrations with surface fluxes under different farming practices



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## Background Information

- ❑ Agriculture is responsible for two-thirds of all anthropogenic nitrous oxide (N<sub>2</sub>O) emissions worldwide.
- ❑ It is estimated that between 40 and 70 percent of N<sub>2</sub>O emissions from agricultural soil in temperate climates occur during a short period (1-3 weeks) when frozen soil thaws.
- ❑ There is a research gap in how different farming practices such as cover crops and N fertilizers affect soil N<sub>2</sub>O concentration at different depths and its link with the surface flux.

## Research Objectives

- ❑ To understand the temporal and spatial changes of soil N<sub>2</sub>O concentration over the spring-thaw period and growing season as impacted by cover crop and fertilizer management.

## Methodology

- ❑ This study was conducted at the TGAS research station with four plots.
- ❑ Soil gas samples at four soil depth were collected (Figs 2 and 3).
- ❑ Cover crops (rye) were planted on the eastern Fields 2 and 3 during the fall of 2021.; EENF(50lbs/ac Entrench coated urea and 50lbs/ac Centuro dribble banded) was applied to the northern Fields (1 and 2), while conventional N fertilizer (100lbs/ac urea ) was applied to the southern Fields( 3 and 4).

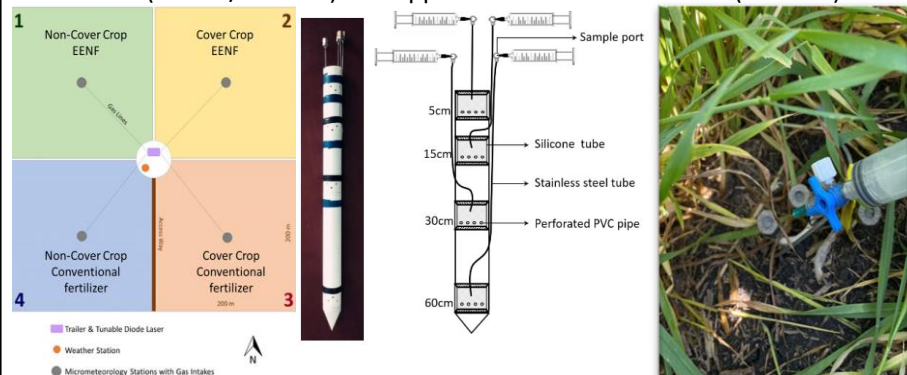


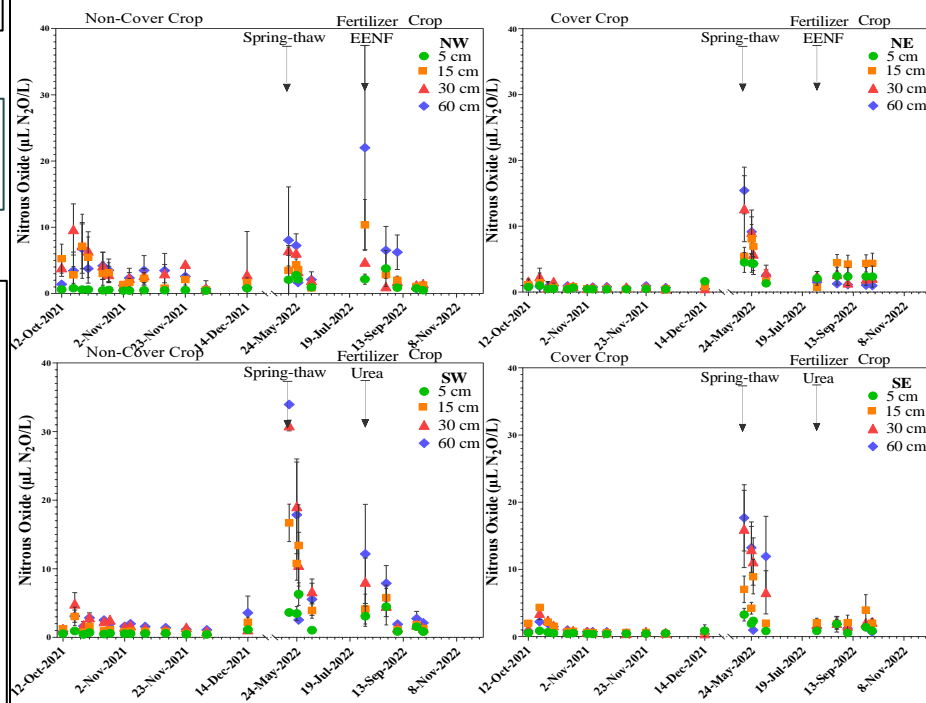
Fig-1

Fig-2

Fig-3

## Preliminary Results

- ❑ With increasing temperature and moisture from the first of May, Soil N<sub>2</sub>O concentration at all depths increased during the spring thaw.
- ❑ We also observed that N<sub>2</sub>O concentrations at 30 cm and 60 cm were about 2.7- and 1.3 times higher compared to the shallow depth.
- ❑ SW had the highest N<sub>2</sub>O concentration during spring thaw, reaching 34 μL N<sub>2</sub>O/L.
- ❑ The effect of cover crop on N<sub>2</sub>O concentration was not significant.



## Conclusion

- ❑ Soil N<sub>2</sub>O concentrations increased over the spring thaw due to increasing soil moisture and temperature.

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