

N2O emissions in a wet growing season in Iowa



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Research objective

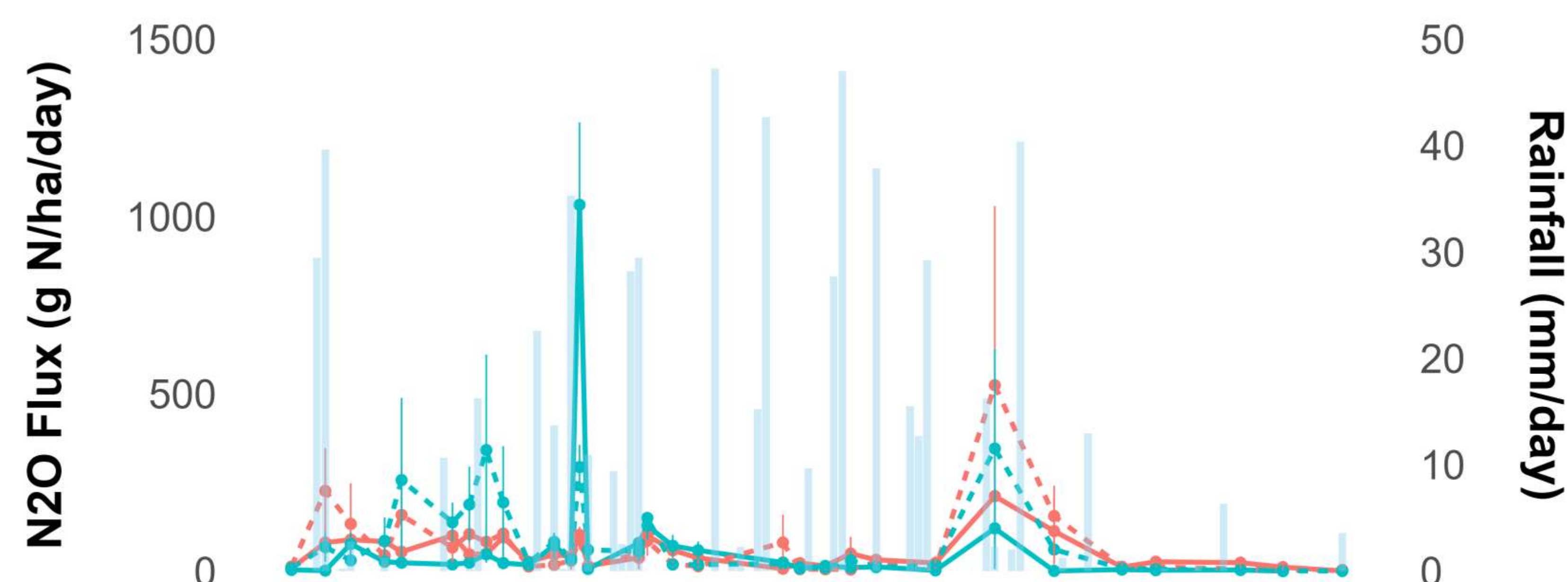
Evaluate the N₂O emissions during the growing season in central Iowa for corn and soybean under different combinations of tillage systems and cover crops treatments.

Methodology

N₂O emissions were measured in 36 plots in Ames, IA, during the 2025 growing season, from May to October, including the combinations of Crop (corn, soybean), Tillage (till, no-till), and Cover Crop (with Rye, without Rye). Fluxes were monitored using a Licor LI-7820 gas analyzer. Measurements were taken twice a week and following rainfall events exceeding 10 mm.

$$\text{FN}_2\text{O Dry (nmol m}^{-2} \text{ s}^{-1}) * 24.192 = \text{FN}_2\text{O (g N}_2\text{O-N ha}^{-1} \text{ day}^{-1})$$

Corn N₂O Fluxes and Daily Rainfall



Soybean N₂O Fluxes and Daily Rainfall

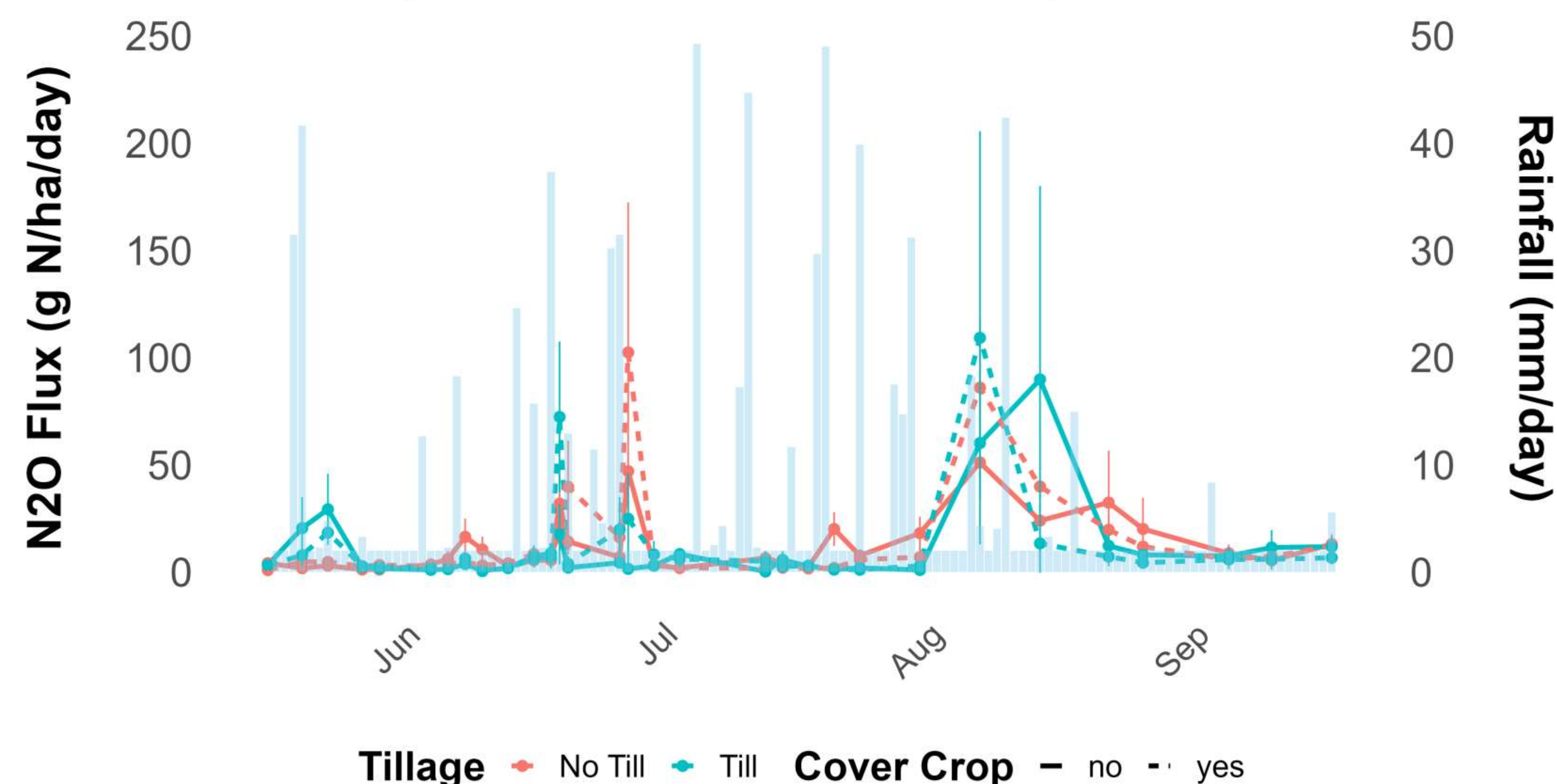


Fig. 1. Daily N₂O-N flux patterns in a) Corn and b) Soybean by Tillage and Cover Crop.

Acknowledgments

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Results

N₂O Emissions during 2025 season

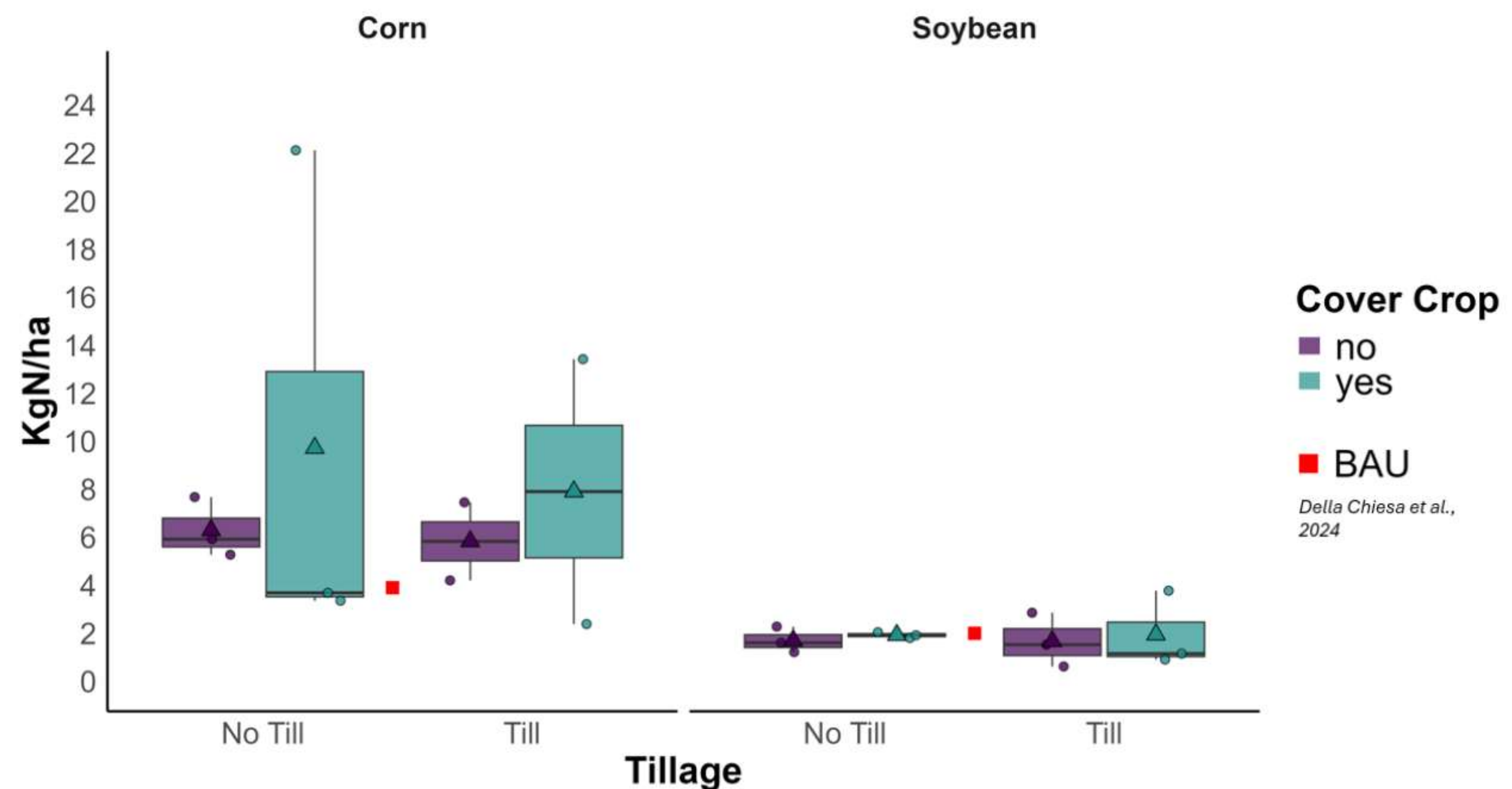


Fig. 2. Accumulated Kg N-N₂O emitted during the 2025 growing season in Central Iowa. Calculated by the area under the curve of the daily fluxes.

Key Observations

- ✓ Crop was the primary factor influencing the rate of emissions, with a significant effect.
- ✓ Corn had higher emissions than soybean across all the treatment combinations.
- ✓ Emissions were higher when the rye cover crop treatment was applied in corn, especially at the beginning of the growing season. But without a significant effect.
- ✓ Tillage did not affect cumulative N₂O emissions.
- ✓ Higher precipitation during the growing season compared to values under BAU (business as usual) practices, led to higher emissions in corn than in a regular year (4kg/ha/yr). But not in soybean.

