

# RELATIONSHIP BETWEEN SOIL PROPERTIES AND CO<sub>2</sub> AND N<sub>2</sub>O EMISSIONS IN CORN-SOYBEAN ROTATION

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## INTRODUCTION

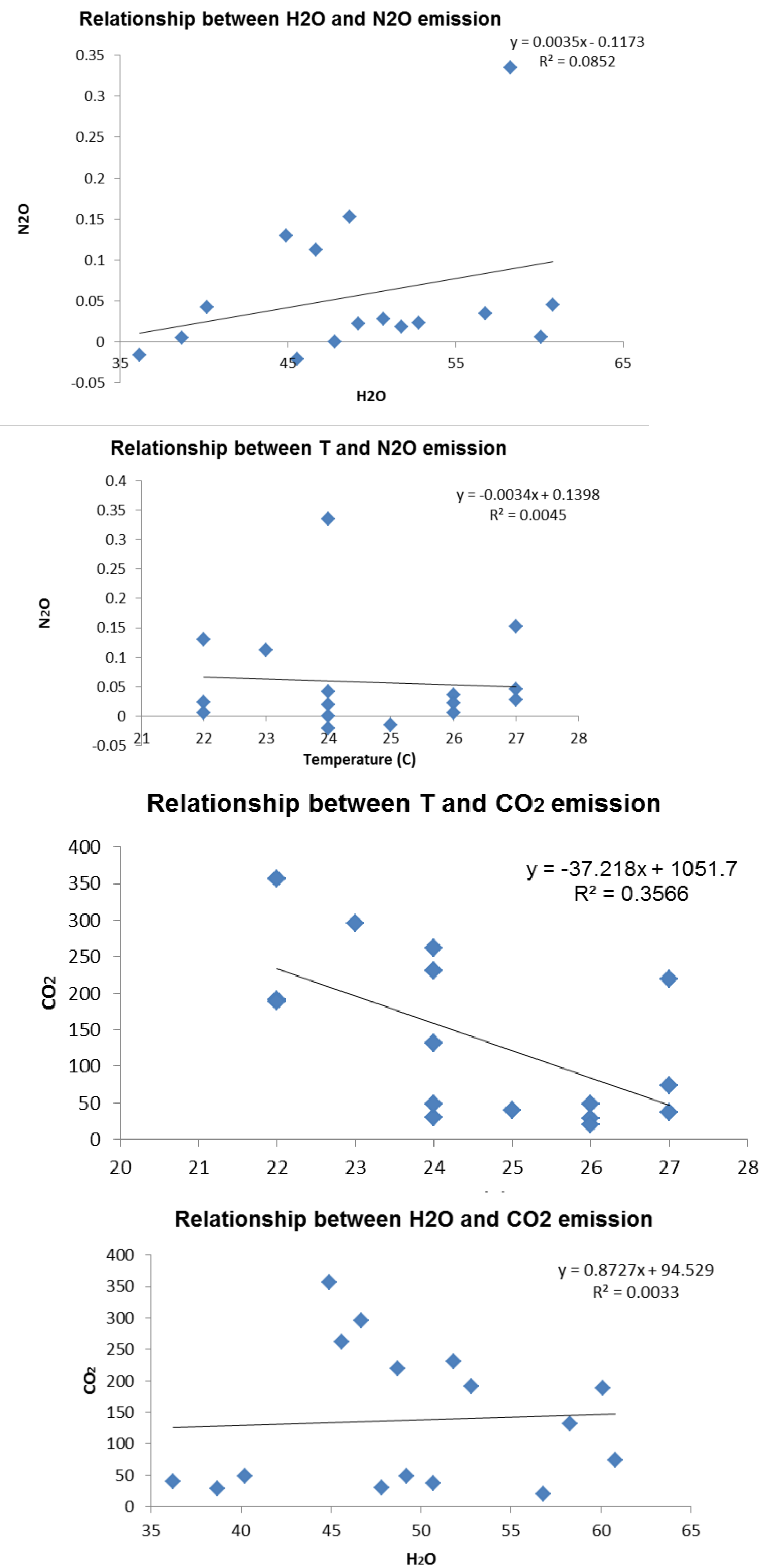
Emissions of CO<sub>2</sub> and N<sub>2</sub>O from soil are controlled by several soil properties. The objective of this study was to evaluate how soil temperature (T) and moisture (H<sub>2</sub>O) relate to CO<sub>2</sub> and N<sub>2</sub>O emissions in a corn-soybean rotation.

## MATERIALS AND METHODS

The study was conducted in a Waldron silt clay loam at Freeman farm at Lincoln University. Data on CO<sub>2</sub> and N<sub>2</sub>O emissions was collected from June to September 2013 at 16 locations in a 4 acres field using a PhotoAcoustic Gas Analyzer (PAGA). Soil temperature (T) and moisture (H<sub>2</sub>O) were measured with a KD-2 probe and a TDR 300, respectively.

## RESULTS

Summary of Statistics for the entire data in 2013				
	N <sub>2</sub> O	CO <sub>2</sub>	H <sub>2</sub> O	T
	(ug N-N <sub>2</sub> O/m <sup>2</sup> h <sup>-1</sup> )	(mg C-CO <sub>2</sub> /m <sup>2</sup> h <sup>-1</sup> )	(m <sup>3</sup> m <sup>-3</sup> )	(°C)
Mean	0.07	157.41	22.05	24.15
SD	0.09	128.73	2.78	4.25
Min	-0.05	4.66	14.07	17.00
Max	0.34	798.23	27.70	33.00
Range	0.39	793.58	13.63	16.00
Med.	0.03	161.04	21.97	24.00



## SUMMARY

Results showed that, on month to month basis, CO<sub>2</sub> negatively correlated with T while positively correlating with H<sub>2</sub>O. Soil moisture also correlated with T. Similarly, when all the data was combined, CO<sub>2</sub> still negatively correlated with T (p = 0.0001, r = -0.68). N<sub>2</sub>O also maintained its negative correlation with T (p = 0.0097, r = -0.27). Finally, soil temperature also continued to correlate with soil moisture (p = 0.0001, r = 0.53).

## CONCLUSION

The results on the relationship between T and CO<sub>2</sub> suggest an opposite direction to the trend reported by previous authors. Therefore, more studies are needed to understand what factors are responsible for the shift to that relationship.



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