4-2020

Capturing Spatial Variability in Maize and Soybean using Stationary Sensor Nodes

Jasreman Singh
University of Nebraska-Lincoln, jasreman.singh@huskers.unl.edu

Derek M. Heeren
University of Nebraska-Lincoln, derek.heeren@unl.edu

Yufeng Ge
University of Nebraska - Lincoln, yge2@unl.edu

Geng Bai
University of Nebraska-Lincoln, gbai2@unl.edu

Capturing Spatial Variability in Maize and Soybean using Stationary Sensor Nodes

Jasreman Singh[1], Derek M. Heeren[1], Yufeng Ge[1], and Geng Bai[1]

[1] Department of Biological Systems Engineering, University of Nebraska-Lincoln, Lincoln, NE

BACKGROUND

- Irrigation in agriculture maximizes crop yield and improves food security globally
- Irrigation scheduling is strongly based on the ability to accurately estimate the appropriate amount and timing of water application
- The timing of the irrigation can best be informed through the crop canopy stress, and the amount of irrigation is informed through soil moisture depletion

RESEARCH OBJECTIVES

- Developing upper (non-water stressed) and lower (non-transpiring) baselines for irrigated and non-irrigated maize and soybean
- Investigating the relationship between the canopy stress and the soil moisture stress

APPROACH

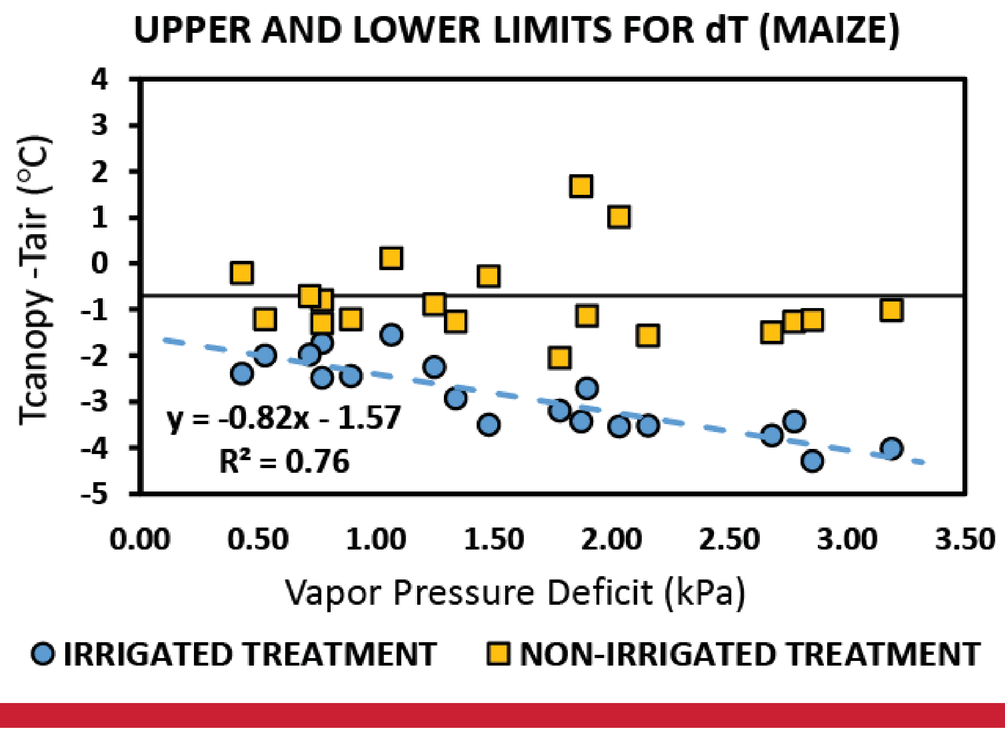
Fig. 1 (a)

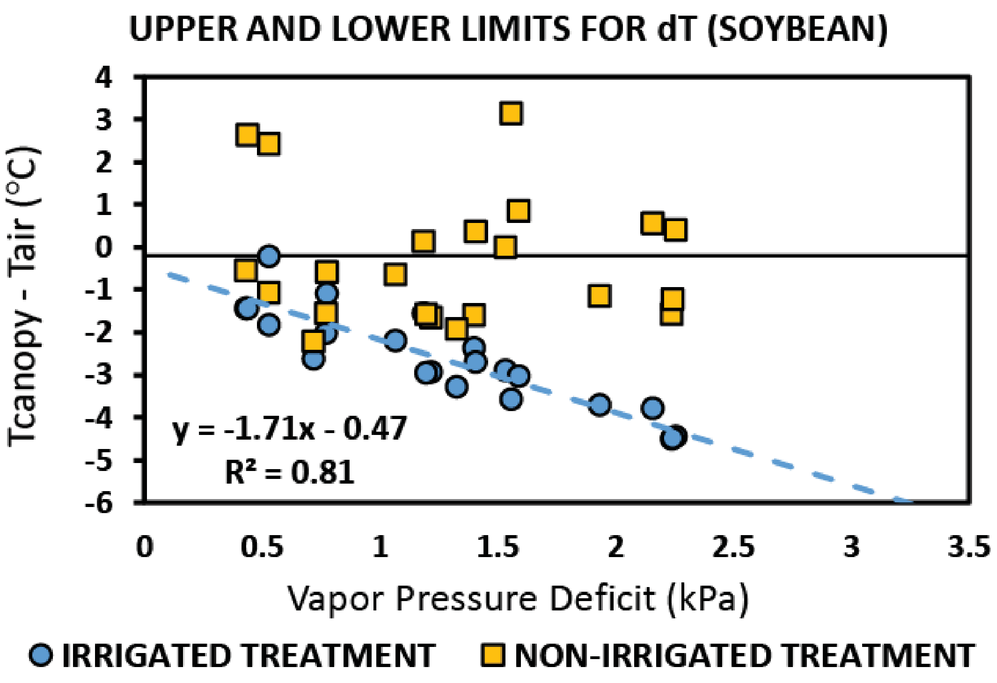
Fig. 1 (b)

a) Installation of GS-1 soil moisture sensors in the field during the beginning of the growing season.

b) Stationary sensor node recording temperature and surface reflectance parameters over maize during full canopy cover

RESULTS





CONCLUSIONS

The canopy temperature stress and soil moisture depletion had **stronger** correlation for **non-irrigated** treatments in **soybean** than maize

RECOMMENDATIONS

Relationship between crop canopy stress and soil moisture depletion is an indicator of irrigation requirement

ACKNOWLEDGEMENTS

The authors are grateful to the Daugherty Water for Food Institute, and the United States Department of Agriculture – National Institute of Food and Agriculture (USDA-NIFA) for funding and support.