Quantifying the Impacts of Cover Crops on Soil Moisture and Temperature

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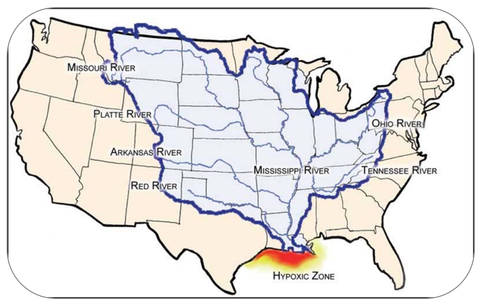
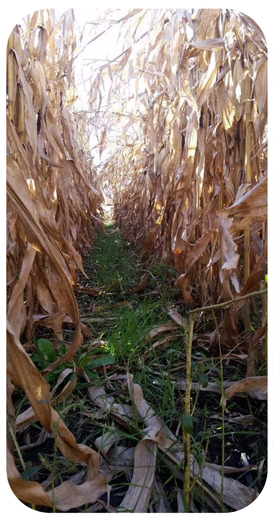
Introduction and Rationale

One of the leading causes of adverse environmental impacts in the Gulf of Mexico is nitrate-N originating from agricultural systems in the Midwest.





In Iowa, cover crops (left) are planted in the fall and grow in the spring before the cash crop is planted. These act as a mitigation strategy for nitrate-N leaching. However, they are a cost to the farmer and a potential decrease in yield because of the shift in water and temperature.

The objective of this study was:

1. To quantify the effects of a winter rye cover crop on soil moisture and temperature in a corn and soybean rotation in a tile drained system in north central Iowa.

Experimental Procedure

Study began in 2010 with 2 treatments (4 plots each):

- **Corn and Soybean Rotation with Winter Rye**
- **Corn and Soybean Rotation without Winter Rye**

DECAGON 5TE SOIL MOISTURE AND TEMPERATURE SENSORS

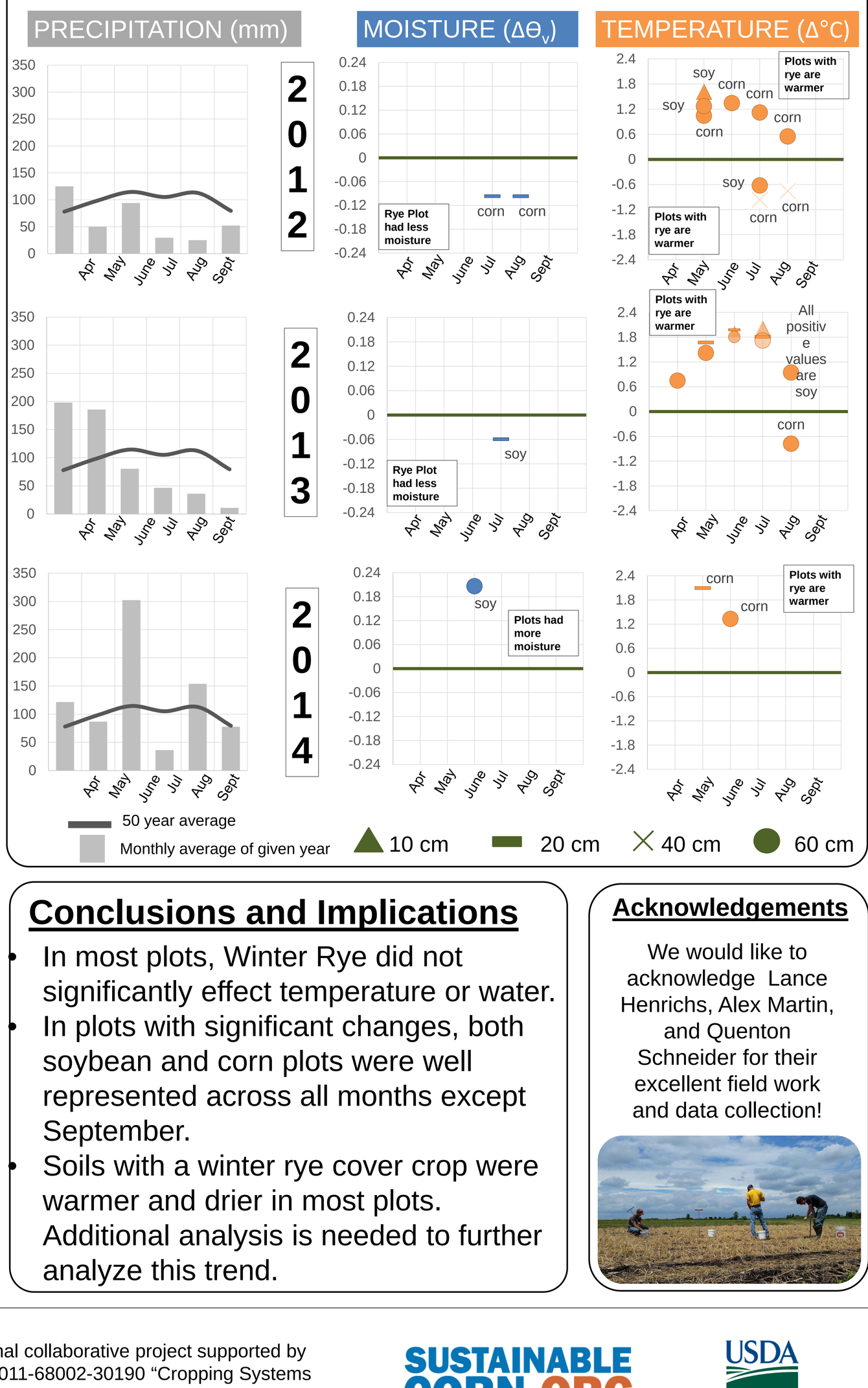
Placed at 4 depths in each plot:
10 cm, 20 cm, 40 cm, 60 cm

Logged and analyzed 5 minute intervals from 2012-2014

Results and Discussion

When comparing No Till with Rye to No Till without Rye, only 27/ 324 Treatment-Month-Depth Combinations were different ($p<0.05$). These differences are shown below.

DIFFERENCES IN MONTHLY AVERAGES



Conclusions and Implications

- In most plots, Winter Rye did not significantly effect temperature or water.
- In plots with significant changes, both soybean and corn plots were well represented across all months except September.
- Soils with a winter rye cover crop were warmer and drier in most plots. Additional analysis is needed to further analyze this trend.

Acknowledgements

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