

Tillage, Cover Crops and Infiltration

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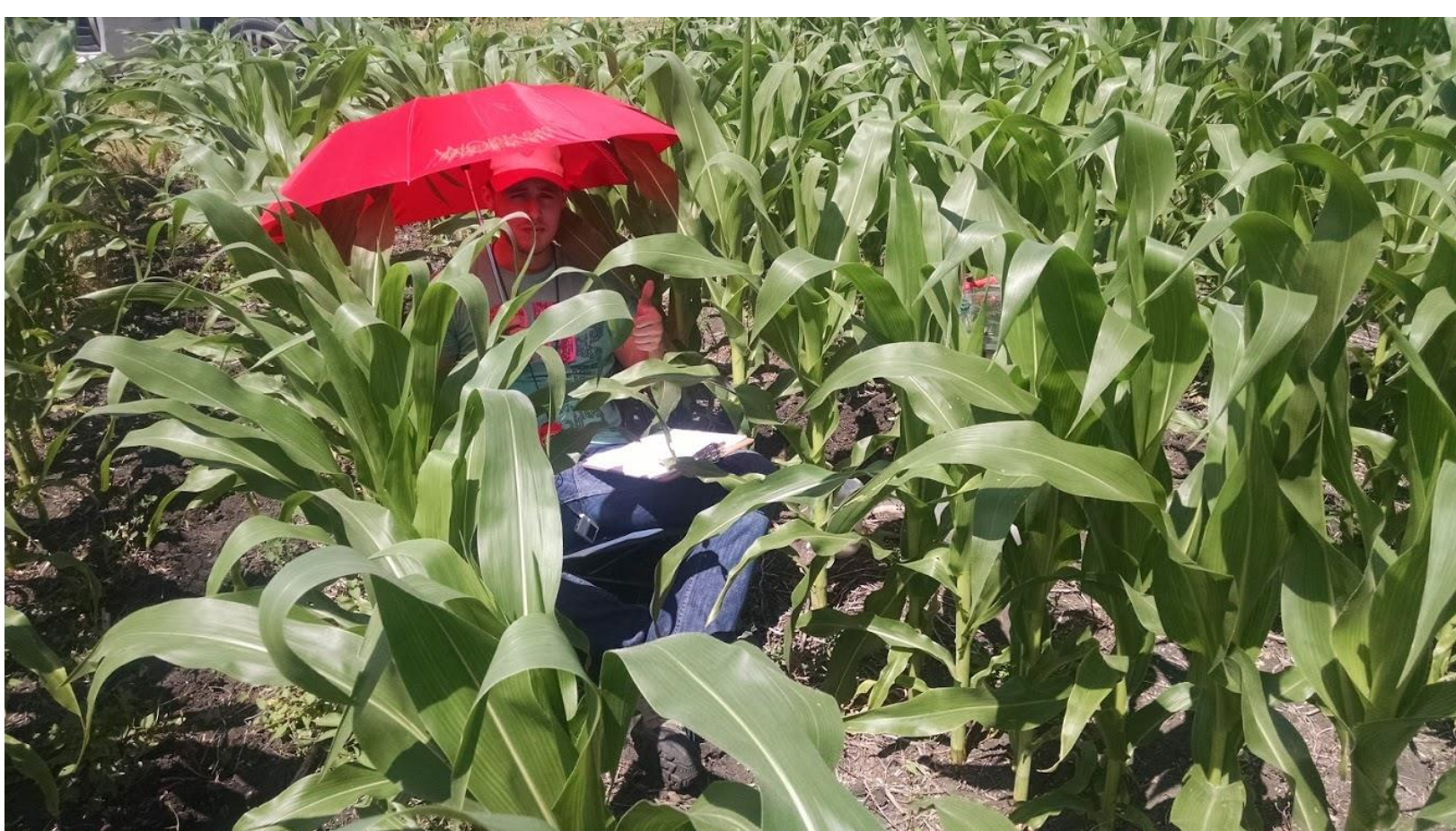
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Introduction and Rationale

Water infiltration rate is an important factor when determining soil structure and function. Higher infiltration rates reduce runoff from intense storm events, lower nutrient loading and help capture more plant available water in variable weather. Management practices likely play a key role in soil infiltration rates, so our objective is to understand the impacts of tillage and cover cropping on the saturated soil infiltration rate of a corn and soybean rotation in central Iowa.

Experimental Procedure

Using a Cornell sprinkle infiltrometer (Ogden et al, 1997) saturated soil infiltration rate was obtained at the Boone, IA and Gilmore City, IA sites from 2012-2015. Both sites are corn/soy. The Boone site is an RCBD under no-till with and without rye cover. Gilmore city is a CRD with conventional till, no-till and no-till+rye



Results and Discussion

Results from the Boone site were analyzed as a RCBD individually by year and as a whole with a split plot in time. Year was found to be the only statistically significant ($P \leq 0.05$) effect on saturated soil infiltration rate. The Gilmore City site was analyzed as a repeated measures study and found a highly significant interaction ($P \leq 0.001$) between treatment and year. At Gilmore City conventional tillage had higher infiltration than both no-till and no-till+rye in all years but 2012,

while no-till+rye had higher infiltration rates than no-till alone. Over the 4 years studied, the no-till and no-till+rye treatments saw declining infiltration rates while conventional tillage treatments remained relatively stable.

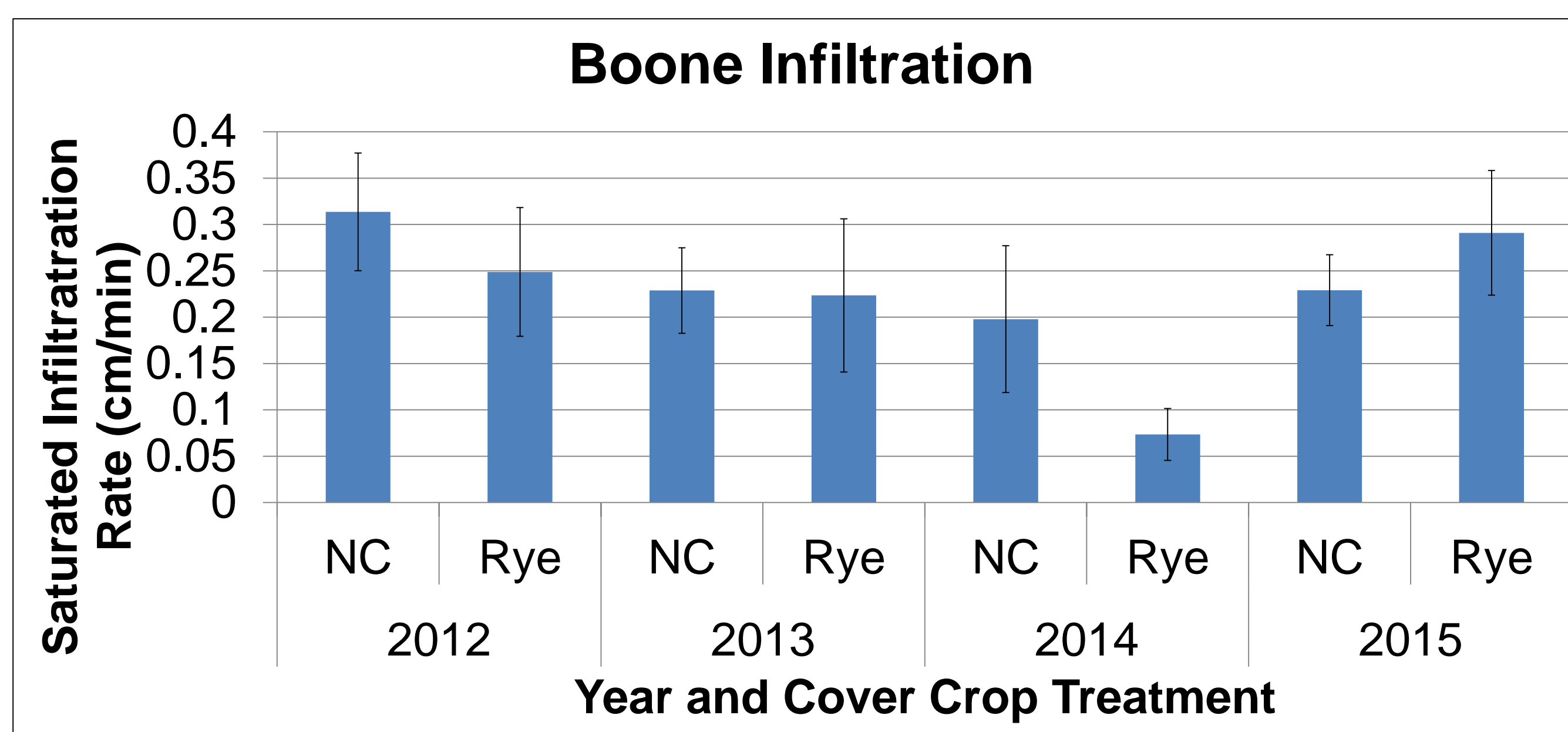


Figure 1: Boone Infiltration Data, 2012-15. NC= No Cover

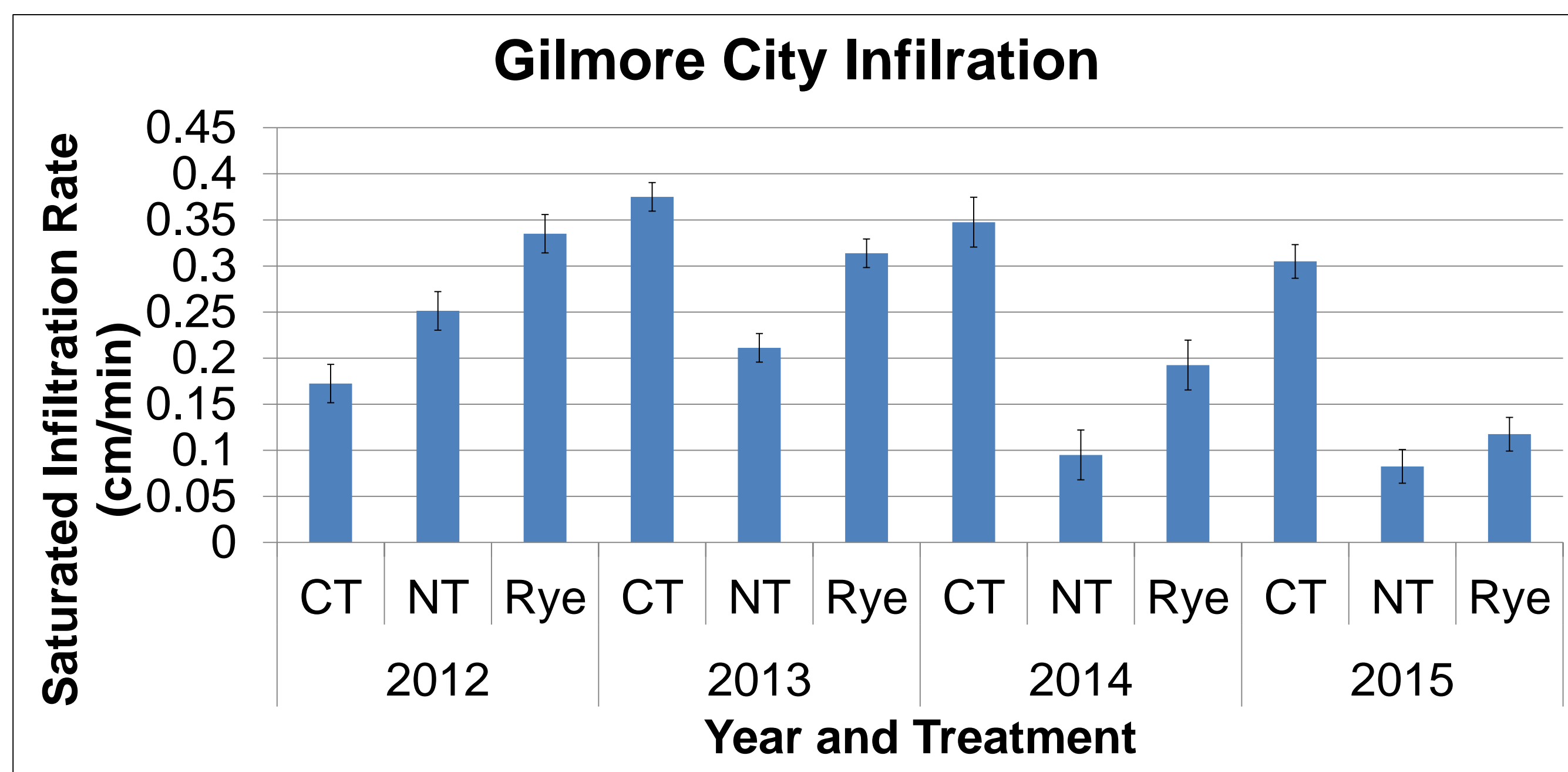


Figure 2: Gilmore City Data, 2012-15. CT=Conventional Tillage, NT= No-till, Rye= No-Till+Rye cover crop



Conclusions

Management practices can affect saturated soil infiltration rates, but not as hypothesized. Cover crops weren't a silver bullet at these sites and impacts likely rely on cover crop growth. Growth was not extensive at these sites.

Recommendations

Maximizing cover crop growth will likely maximize soil infiltration impacts. Go big or go home!

Acknowledgements

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