FALL TILLAGE AND MANURE APPLICATION TIMING AFTER CORN SILAGE AFFECT WINTER RUNOFF LOSSES

Background

Wintertime land-applications of manure is a common practice because of the high cost of manure storage. The presence of frozen soil and snow create challenges for on-farm nutrient retention, as up to 75% of annual runoff can occur during thaws.

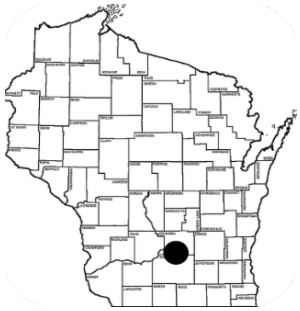
Project Goals

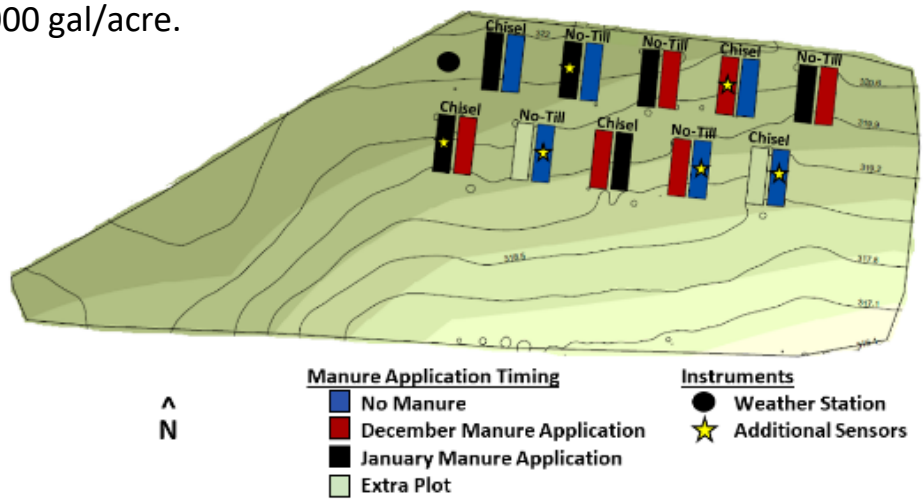
1. Determine the impact of management practices on runoff and nutrient losses on frozen soils
   - Tillage (Fall chisel) vs. no-tillage
   - Manure application timing (December, late-January, and no-manure)

2. Identify weather and soil properties that control infiltration/runoff & nutrient losses

Methods

This study was established at UW Arlington Agricultural Research Station in 2015. The field has a 6% slope, silt loam soil, and is in continuous corn for silage. Manure application rate was 4000 gal/acre.





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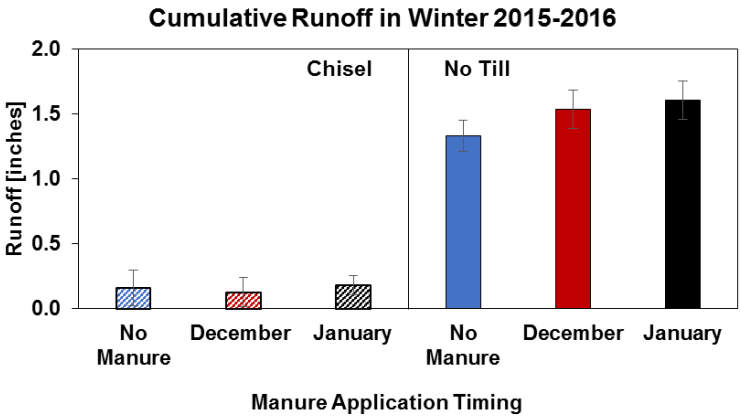
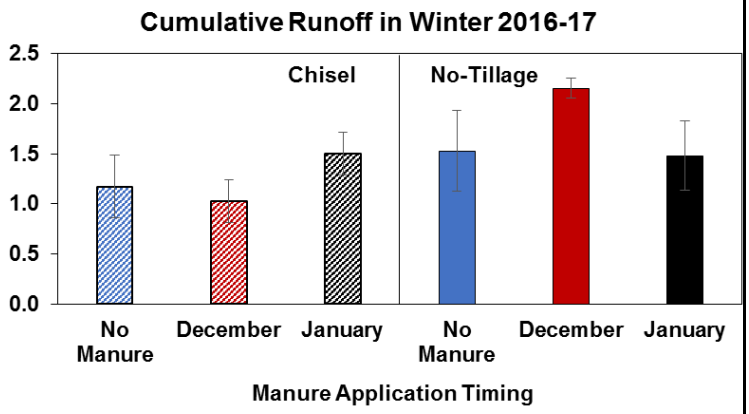
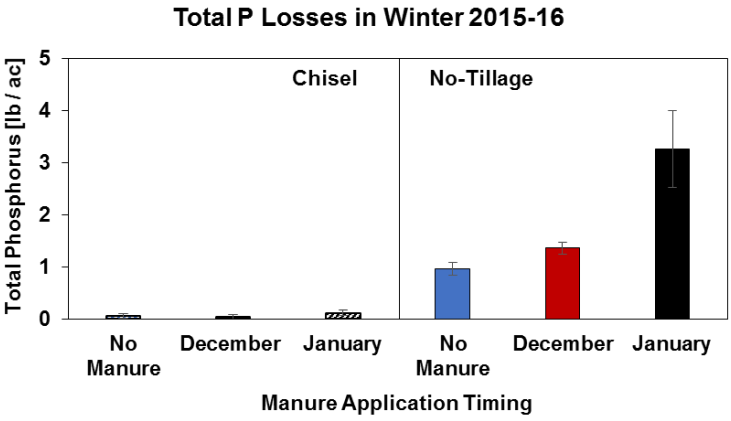
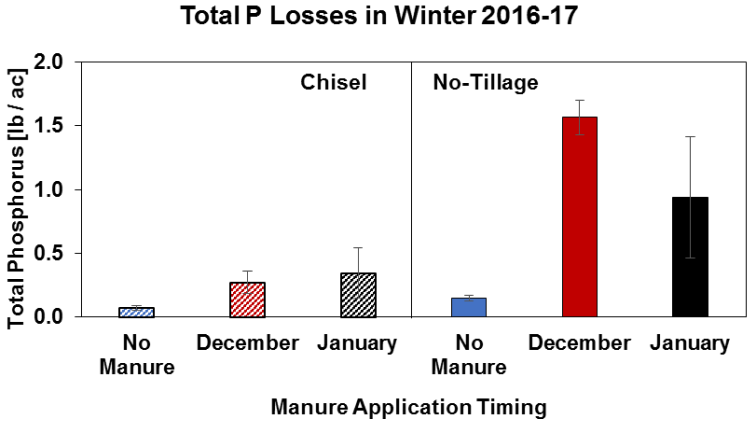
Results & Explanation





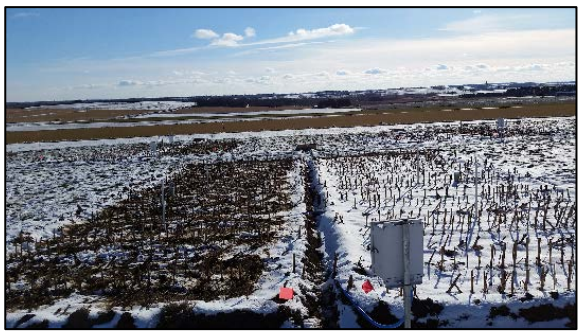
Plots with no-tillage plots were twice as likely to produce runoff compared to plots with tillage during the frozen seasons.





Seasonal nitrogen losses ranged 0.5 – 2.7 lb/ac under tillage and 0.7 – 25.2 lb/ac under no-tillage. Seasonal phosphorus losses ranged from 0.0 – 0.3 lb/ac under tillage and 0.1 – 3.3 lb/ac under no-tillage.

Fall tillage collected meltwater on the soil surface, which increased the time for infiltration into frozen soil. Manure application increased sunlight absorption, which accelerated snowmelt. This field study provides additional understanding of winter runoff processes and evaluates nutrient retention.



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