

Protecting Water Quality with Cover Crops and Phosphorus Fertilizer Management

Nathan Nelson, Kraig Roozeboom, Peter Tomlinson, Gerard Kluitenberg, and Jeff Williams

Cover Crops:

- 2016: Winter wheat prior to soybean
- 2017: Triticale and rapeseed prior to corn
- Data averaged over fertility treatments

Weather

- 2016: 41.8 inches of rain, good distribution
- 2017: 30 inches of rain, dry June and July

Two years remaining in the study

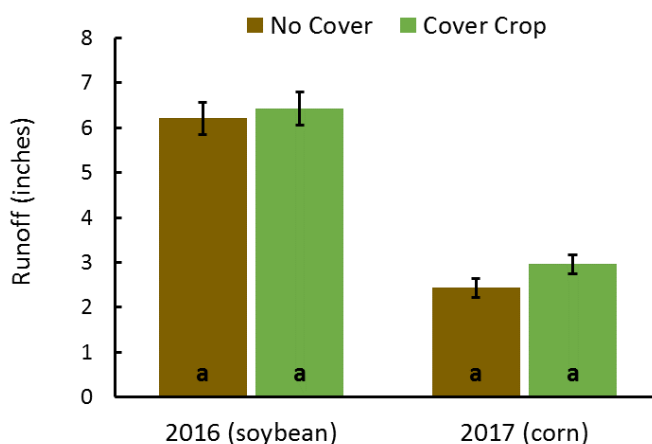


Figure 1. Cover crop did not affect the amount of runoff from no-till corn-soybean.*

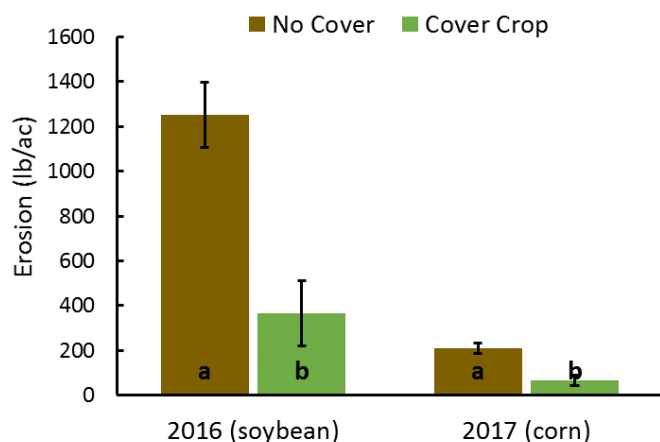


Figure 2. Cover crop reduced the sediment loss by 70% in a no-till corn-soybean system.*

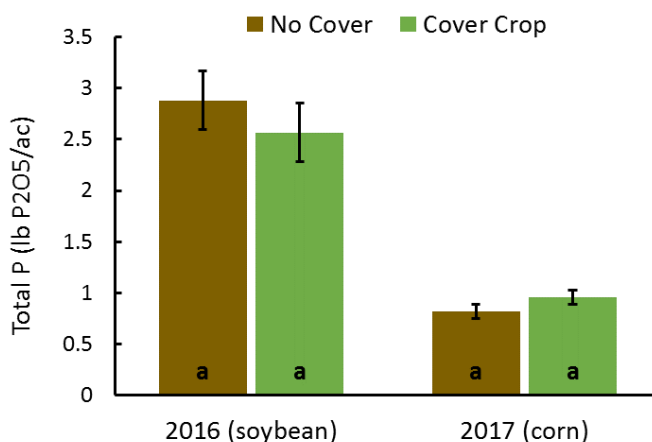


Figure 3. Cover crop had no effect on the amount of total P lost in surface runoff.*

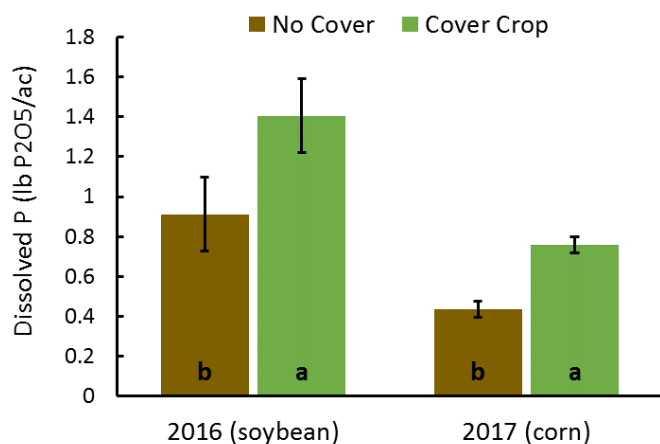


Figure 4. Cover crop increased the amount of dissolved P loss by 50 to 70%.*

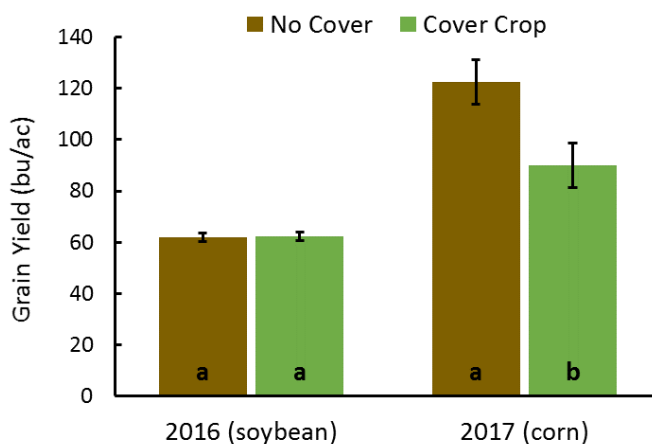


Figure 5. Cover crop did not effect soybean yield in 2016 and decreased corn yield by ~25% in 2017.*

*bars with different letters are significantly different within a given year or crop (p<0.05).

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Phosphorus Fertilizer Management:

- Control (no P application)
- Fall Broadcast (50 lb P₂O₅/ac applied on the surface in Nov./Dec.)
- Spring Injected (50 lb P₂O₅/ac applied at planting in a 2x2 placement)

Two years remaining in the study

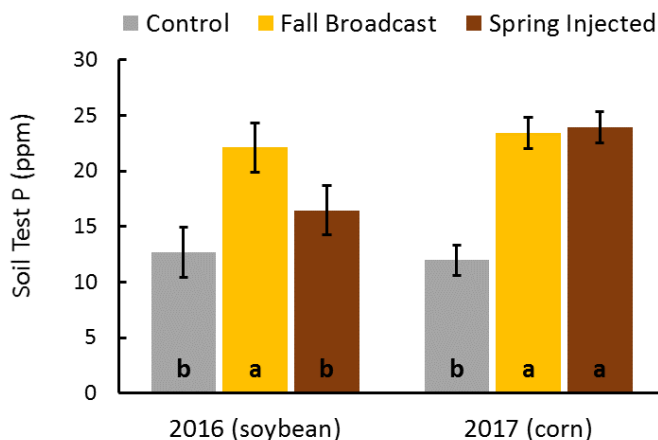


Figure 6. Phosphorus fertilizer application increased soil test P and maintained it above the critical level.*

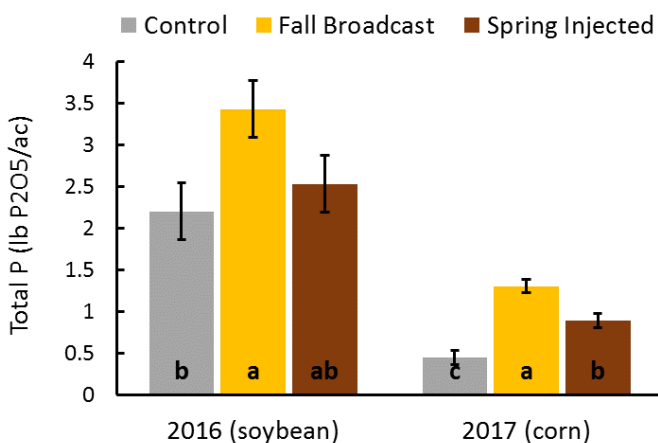


Figure 7. Sub-surface fertilizer placement decreased total P loss by 26% in 2016 (p=0.07) and 32% in 2017 (p=0.005).*

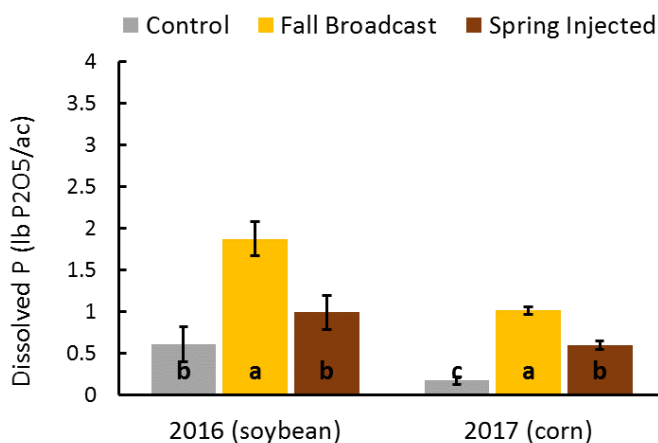


Figure 8. Sub-surface fertilizer placement decreased dissolved P loss by over 40% each year.*

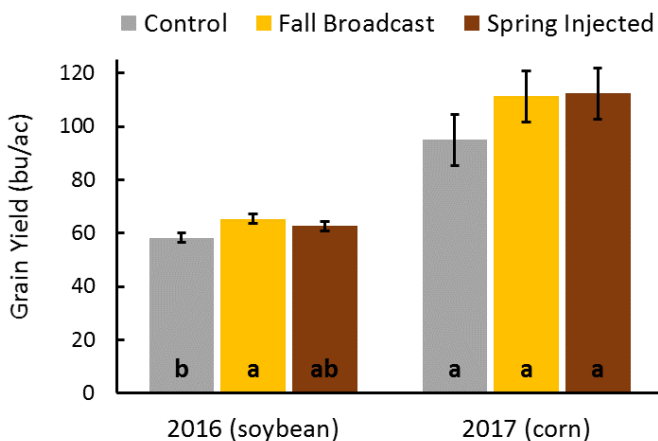


Figure 9. P Fertilizer application increased soybean yield by 10% (p=0.02) and corn yield by 18% (p=0.07).*

Thank you to our funding agencies



*bars with different letters are significantly different within a given year or crop (p<0.05).