No-Till Organic Corn Production

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Introduction

- In 1990 the Organic Foods Production Act was created to facilitate the domestic production and marketing of domestic food
- Organic products earn higher prices; that results from higher production and distribution costs for organic goods and the willingness of consumers to pay for those costs.. (Dimitri and Oberholtzer, 2005).
- In addition, while organic N fertility sources are not as directly tied to rising fuel costs as are synthetic N fertilizers, well-developed, research-based recommendations for organic N rates in both tilled and no-till systems could also help enhance the profit picture for producers of organic corn.
- The objective of this study was to evaluate the effect of cover crops, tillage and N rates of two organic N sources on organic corn production

Materials and Methods

- This experiment was carried out during 2008 in two locations: Lexington (central KY) and Princeton (western KY).
- The experimental design was a split-split plot with, four replications.
  - ⇒ Whole plots consisted of hairy vetch and winter rye.
  - ⇒ Split plots were moldboard plowed (MP) and no-till (NT).
  - ⇒ Split-split plots were nine (9) treatments consisting of two N organic sources, with 4 rates (45, 90, 135, 180 kg/ha) plus a common control (0 kg N/ha)
    - The N sources used were a biosolid Louisville green (LG) 5-3-0 not accepted by NOP but used by many farmers and Naturesafe (NS) 10-2-8 a source accepted by NOP.
- In Fall 2007 both cover crops (CC) were planted. On June 5, 2008 CC were rolled down using a roller crimper machine. Tillage of MP split plots was performed just prior to planting of the entire experiment.

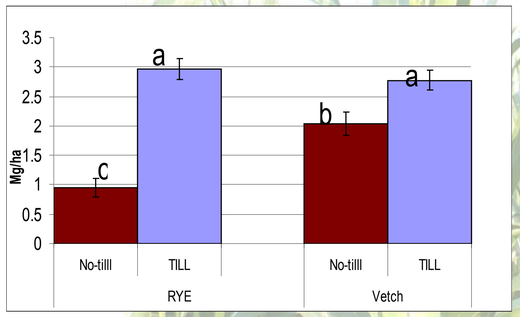

Figure 1. Corn yield response to tillage and covercrop in Lexington, KY

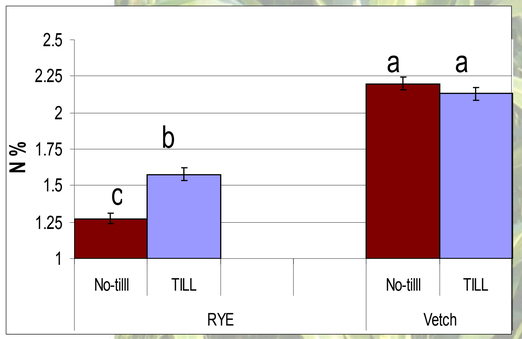

Figure 2. N ear leaf response to tillage and covercrop in Lexington, KY

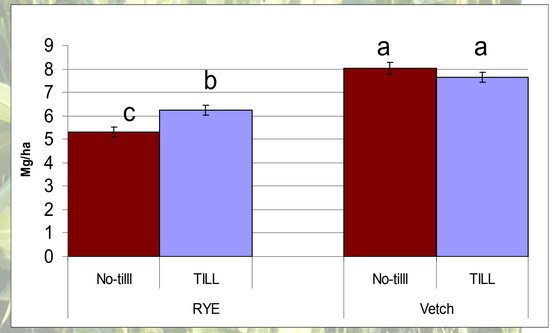

Figure 3. Corn yield response to tillage and covercrop in Princeton, KY

Results and Discussion

- Vetch-MP was the best combination at both locations in terms of yield. In Lexington Vetch-MP and Rye- MP were the best combinations whereas in Princeton Vetch-MP and Vetch-NT were.
- Vetch-MP and Vetch-NT improved N nutrition at Lexington. In Princeton there was not an interaction CC X Tillage for N in ear leaf but there was a significant effect of the cover crops with vetch improving N nutrition.
- Rye-MP was able to provide more N relative to Rye-NT--enough to account for the difference in yield. This might be due to a rapid mineralization of the Rye after being incorporated in soil.
- N sources were not significant for yield in Lexington, but were significant in Princeton with NS averaging 0.36 Mg/ha more than LG. A more warm and humid environment like Princeton might have caused a better mineralization of the organic sources.
- In Lexington, LG 90 kg N/ha and control were not significant different and all the other combinations were not significant different (LSD<0.1). In Lexington, it was a bad season for corn due to water stress and pest damage at the end causing low yields. In Princeton yields were much better and the three better combinations of N treatments were NS 90 , NS 135 and NS 180 kg N/ha.

Conclusions

- The best practices for corn production on Lexington were vetch-MP or rye- NT.
- In Princeton the best results were obtained with vetch-MP and vetch-NT with NS 90, 135 and 180 kg N/ha.
- There seems to be a potential for Vetch- MP and Vetch-NT to improve N nutrition in the crop.