Managing Nitrogen with Strip Tillage Corn Systems in Heavy Clay Soils – GHG Mitigation Approaches.

(Interim Report)

Purpose:

This demonstration project was established to determine if a fall strip tillage system would benefit corn growers on heavy clay soils by offering a wider window for planting corn in the spring and providing greater opportunities for nitrogen management within the strip tillage system. Crop rotations in heavy clay soils have suffered with poor spring planting conditions leading to continuous soybean production or narrow soybean with occasional winter wheat rotations resulting in reduced organic matter and crop yields leading to a potential increase in GHG emissions from these practices.

Methods:

The first year's sites were established in Nov./Dec. of 2003. Treatments of strip till, no-till and conventional till were located at a number of sites. Conventional tillage treatments were fall moldboard plowing or spring cultivation.

At two sites the fields were monitored in the spring to determine the earliest date for which each system could be planted based on soil conditions. Nitrogen was applied at planting or side dress depending on the site. Fields were monitored to evaluate growth differences between the tillage treatments.

In another set of plots, all planting for strip till and conventional tillage occurred at the same time. Various rates and/or timings of N application were made at appropriate times. Rates of N were repeated at both planting and side dress timings. In one site Urea was applied preplant and incorporated through cultivation. At the other site UAN was applied one day after planting with a side dress applicator and then again at side dress time.

Assessments will include planting date, general vigor, plant stand, grain yield.

Results:

There were different planting dates for the tillage systems. In both cases the strip tillage system was in planting condition before the other two systems. This ranged from 5 days to 3 weeks depending on if rain occurred between when strip till plots could have been planted and when the next system was ready. The difference in planting date between the conventional and no till systems was less this year then expected since the soil had rapid dry out during that period of the spring. Conventional treatments on the clay soil dried out rapidly once it could be worked and worked up into a fine powder, which was susceptible to crusting.

Summary:

The strip till system proved to be the treatment that was earliest to be in condition to plant in most cases. This did not always apply depending on the site.

Next Steps:

The economics, feasibility and systems approach to cover crop management including the impact on subsequent soil nitrogen status and corn crop growth will be studied in further detail in the remaining years of this project.

Acknowledgements:

OMAF Field Crop Technology would like to acknowledge the farm cooperators who made land and other resources available for conducting these projects. The partnership with the Cropping Systems Laboratory of the Plant Ag. Department of the University of Guelph has been instrumental in the success of the project to date. Funding for the project has been provided by the Greenhouse Gas Mitigation Project for Canadian Agriculture supported by AAFC in conjunction with OSCIA, IFAO and others.

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Location of Project Final Report: