



Lewis County Farmer Participates in Statewide Manure Incorporation Project

By Sara Zglobicki

Darren McIntyre manages Wyndamar Farm, a dairy farm in Lowville, NY. Following in his parents' footsteps, he currently owns 160 cows and 150 heifers and grows corn and hay on 440 tillable acres.

Like many dairy farmers, McIntyre is interested in using the manure produced by his cows to improve his cropland and reduce fertilizer costs while at the same time minimizing nutrient losses to the environment. He is also interested in reduced tillage systems so when asked if he would join a statewide on-farm research project investigating the effects of shallow manure incorporation on nitrogen and residue conservation, corn yield and quality, McIntyre said yes.



Darren McIntyre of Wyndamar Farm in Lowville, NY is one of ten farmers participating in the NNYADP and NYFVI sponsored on-farm manure application method project.

In 2007, the New York Farm Viability Institute (NYFVI) and the Northern New York Agricultural Development Program (NNYADP) jointly sponsored the manure incorporation study that is coordinated by the Cornell Nutrient Management Spear Program (NMSP).

Quirine Ketterings, Associate Professor in the Department of Animal Science at Cornell University and leader of the NMSP explains, "With high fertilizer prices, many farmers are interested in getting the greatest possible benefits from the manure so fertilizer costs can be minimized. One way to do that effectively is by incorporation of spring-applied manure. Mixing the manure with the soil will drastically reduce ammonia volatilization. However, traditional tillage tools like moldboard and chisel plows are not compatible with reduced tillage and alternative shallow-mixing methods had to be explored."

In the 2008 and 2009 growing season, for each of ten participating farms, surface application of manure without incorporation was compared with application directly followed by either chisel plowing or shallow mixing with an aerator.

"The objective of the study were to compare silage corn yield and quality among the treatments while evaluating the capacity of each treatment to conserve nitrogen and crop residue", said Anne Place, the Cornell Master's student on the project. "Costs of crop production are also being assessed to see if a shallow-mixing aeration tool for manure incorporation can reduce farmer's total input costs while maintaining crop performance."

From Research Station to Farmers' Fields

A three year project comparing chisel plow and aerator incorporation was started in 2005 at the Aurora Research farm. Altria provided funding for the first year of trials while the NYFVI funded the subsequent two years of work. The research showed that shallow mixing and chisel plowing of manure directly following its application were equally effective at conserving ammonia-nitrogen in manure.

Joe Lawrence, then a graduate student with the NMSP, worked on the Aurora Research Farm project as part of his master's degree program in soil science at Cornell University. Lawrence graduated in January of 2008, became field crops extension educator with Cornell Cooperative Extension of Lewis County, and currently coordinates the trial at Wyndamar Farms.

Lawrence was highly motivated to join the statewide project. "I constantly have questions from farmers on how to better utilize manure and reduce fertilizer costs. With corn as a major forage crop on dairy farms, any work to enhance the usefulness of manure on farms will be a big benefit to the farm." Lawrence continued, "Many farms are looking towards reduced till field operations and the results of these trials could open up doors for farms interested in the benefits of manure incorporation and reduced till systems."

Testing Out On-Farm Research

McIntyre uses reduced tillage practices on his farm. To help with fertilizer costs without losing the benefits of reduced tillage, his crop consultant Cook recommended he look into shallow incorporation methods.

Though he had never been involved in a research project before, McIntyre was led by his curiosity to host the trial plots on his farm. "I'm more apt to believe and trust this more personal research."

His Certified Crop Advisor and Nutrient Management Planner Peg Cook explained, "On-farm research is beneficial to farmers, providing the opportunity to identify what may or may not work on their farm depending on management style and soil type and allowing farmers to try a new practice in one field with low economic risk." She also acknowledges the research "keeps me up to date on the latest technology available and helps me fine-tune my recommendations."

Lawrence agrees, noting McIntyre was a "good fit" for the project as he "is progressive with his manure management."

2008 Trial Results at Wyndamar

In 2008, yields of the corn grown where manure had been incorporated were 35-45 bushels/acre greater than in the plots where no incorporation had taken place, with no significant differences in yield between the two incorporation treatments. McIntyre noted, "At a time when money is tight, and after last year's results, I'm really pushing for incorporation of manure and good timing of it this year." In his work with Cook over the past several years he also noticed that where manure was spring applied and incorporated, he could plant corn without a starter fertilizer. The statewide manure application study allows him to investigate the use of an Aerway® aerator as a less aggressive incorporation tool that is more compatible with reduced tillage systems, without having to invest in the equipment right away.

The 2009 yield results are needed to draw final conclusions but McIntyre did notice he needed less fuel to pull the Aerway® aerator, making the tool an interesting alternative to chisel plowing.

Once the 2009 growing season is completed, summary reports will be put together and shared with farmers and farm advisors but some preliminary observations can be drawn already. "So far the results are consistent with what we saw in the 3-year study at the Aurora Research Farm", Ketterings explains. "Shallow incorporation with an aerator tool conserved nitrogen, resulted in greater residue coverage than for chisel plowing, and resulted in yields no different from what was obtained with chisel plowing."

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The **Nutrient Management Spear Program** (NMSP) is an applied research, teaching and extension program for field crop fertilizer and manure management on dairy and livestock farms. It is a collaboration among faculty, staff and students in the Department of Animal Science, Cornell Cooperative Extension, and PRO-DAIRY. Our vision is to assess current knowledge, identify research and educational needs, facilitate new research, technology and knowledge transfer, and aid in the on-farm implementation of strategies for field crop nutrient management including timely application of organic and inorganic nutrient sources to improve farm profitability while protecting the environment. An integrated network approach is used to address research, extension and teaching priorities in nutrient management in New York State. For more information on NMSP projects and extension/teaching activities, visit the program website (<http://nmsp.css.cornell.edu>) or contact Quirine Ketterings at qmk2@cornell.edu or (607) 255-3061.