# St. Lawrence County Farmer Sees Promising Results from Manure Incorporation Trials

*By Sara Zglobicki*

"Participating in on-farm trials gives me an inside edge. It lets me know if I can justify different practices by yield or economics. I may have a gut feeling about something, but once sampling is done, you can prove that feeling one way or another," dairy farmer Dan Chambers of Heuvelton, New York, shares when asked why he chose to be involved in a statewide manure application method project initiated by the Cornell Nutrient Management Spear Program (NMSP). Chambers manages 680 milking cows, 650 heifers and 2000 acres of corn and alfalfa.

Chambers is one of ten farmers throughout the state who established on-farm trials in which manure was spring applied and (1) not incorporated, (2) incorporated shallowly with an aeration tool, or (3) chisel incorporated. Soil in the plots is sampled for fertility assessment at planting, sidedress time, and harvest. Soil moisture, compaction, and residue coverage were measured as well. These data, coupled with corn silage or grain harvest data and results of the Illinois Soil Nitrogen Test (ISNT), Pre-sidedress Nitrate Test (PSNT) and Late Season Corn Stalk Nitrate Test (CSNT) allow the team to examine the impact of the different application methods on corn yield and quality, nitrogen capture and losses, soil conservation and fuel costs.

The trials are coordinated by Cornell soil science masters student Anne Place. "The manure management study is an expansion of a previous study that was started at the Musgrave Research Farm in central NY in 2005. Those first trials showed that shallow incorporation of manure was as effective as chisel incorporation in capturing nitrogen without the complete turnover of the soil," Place said. "The next logical step was to see how well shallow incorporation worked across a wide variety of soil types."

Quirine Ketterings, associate professor in the Department of Animal Science, leader of the NMSP and lead-PI on the project, worked with extension educators and consultants to identify the ten farms in the study. "The farms represent a wide variety of soils, farm sizes and management styles," Ketterings adds. "When new technologies are developed, they need to be tested under local conditions before we can conclude if they work or not."

### Hosting in Heuvelton

Pete Barney, who retired in December of 2007 after working as a field crops educator of Cornell Cooperative Extension of St Lawrence County for over three decades and now works as an independent agricultural consultant, selected two St Lawrence farms for the study, one with sandy soils and Chamber's Heuvelton farm with clay soils.

"There's a uniqueness to the county, with many different weather patterns and soil types. I was wondering if we could make the same system work in both clay-based and sand-based soils," Barney said. "Manure incorporation is easy on sandy soils. On clay, it [the manure] doesn't dry out as quick, …[especially] as the percent of clay increases. As clay content increases, you have to be careful. If you work the soil when it is wet, you'll have hard, cloddy fields."

Dan Chambers (left), dairy farmer in St Lawrence County, talks with Pete Barney, Barney Agronomic Services, during corn silage harvest of the manure application study at Chamber's farm in Heuvelton, NY.

## 2008 Season Trial Results

Last season's trials on Chambers Farm showed a two ton difference in yield between plots where manure was or was not incorporated. Both the chisel and the Aerway® incorporated plots had the same yields. The PSNT and stalk nitrate tests indicated the difference in yield was likely due to increased nitrogen conservation in the plots where manure had been incorporated with no difference in nitrogen conservation between the chisel and Aerway® treatments.

Chambers listed some additional observations as well, noting that he likes "the Aerway because it doesn't pull up stones," and that the trial "solidified my numbers …[comparing] incorporation and non-incorporation of manure." He continued, "The Aerway is easier to pull and you need less horsepower to pull it. In all, the total money spent is less. There's also a surface difference in using the two pieces of equipment. After one pass with each piece of equipment, there's more residue left after the Aerway passes."

## NNYADP and NYFVI Support

The Northern New York Agricultural Development Program (NNYADP) and the New York Farm Viability Institute (NYFVI) provided funding for the two year project that started in the spring of 2008 and is being continued through the 2009 growing season.

"Research conducted under Northern New York growing conditions on how to best use on-farm and purchased nutrients provides farmers with valuable data that can produce higher-yield crops and save or make money for the farm while also protecting the farm's natural resources," says NNYADP Co-Coordinator Jon Greenwood.

John Lincoln, owner of Linholm Dairy Farm in Bloomfield, NY and chairperson of the NYFVI board of directors, adds, "We were interested in a project that explored several tillage systems in various soil conditions. The outcome of this work may have implications for nutrient management and fertilizer costs, soil health, crop yield, fuel costs, and odor control, all factors New York's dairy farmers told us they wanted to see research around. The on-farm trials and the farmer-to-farmer education ensure that this work will continue to offer solutions for farms for years to come.''

## Benefits of On-farm Research

Chambers is constantly looking for ways to improve the family operation. He reflected, "We typically surface apply our manure in the spring or fall and field cultivate or chisel plow to incorporate it. I am interested in switching to an aerator or to injection, because I'd like to get rid of odor complaints and manure is costly to deal with, so you need to take every advantage of it that you can." The statewide manure application method project was an excellent opportunity to test the performance of the aerator.

Chambers shares his results with other farms as he hopes that a lot of farmers will learn from the trials, noting that "if one [farm] tries a new technique, all can learn from it instead of all of us doing the same thing."

Ketterings concurs, "Farmer to farmer education is essential if you want to test, develop, and help with implementation of more sustainable management alternatives that are applicable across the state." We are limited in the number of research trials we can handle, but with the participation of extension, consultants and farmers, and with the financial support from funding sources such as the NNYADP and NYFVI, we can get real answers and facilitate implementation of the most promising practices."

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The **Nutrient Management Spear Program** (NMSP) is an applied research, teaching and extension program for fieldcrop 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.