



## Eastern New York Dairy Looks to Gain Economic Benefits from Manure Study

*By Anne Place*

Brian Chittenden is a fourth generation farmer who currently owns and operates Dutch Hollow Farm, LLC with his parents and two brothers in Columbia County, New York. The farm itself was established in 1976 and consists of 1800 acres of cropland. It is also home to 450 milking registered Jersey cows which Chittenden plans to expand to a 650 cow operation this year.

Chittenden is one of ten dairy farms participating in a 2-year study on the impact of manure incorporation methods on corn yield and quality, nitrogen and residue conservation. This is a project conducted by the Cornell Nutrient Management Spear Program (NMSP) in collaboration with the farmers and extension or consultant farm advisors.

### Manure Incorporation Methods

The manure management study is specifically assessing the potential benefits of shallow incorporation of manure in reduced tillage systems. The New York Farm Viability Institute and the Northern New York Agricultural Development Program are providing funding for the two year on-farm trial that started in the spring of 2008 and is being continued through the 2009 growing season. All ten farms in this study have implemented at least three different treatments: (1) surface-applied manure (no incorporation); (2) shallow incorporation using an aerator, and (3) an application method chosen by the farmer. Most farms opted to compare the aerator incorporation with chisel plowing or the use of field cultivators.

At Chittenden's farm a fourth treatment was added to the trial. The trial includes a comparison between chisel incorporation and incorporation with an Aerway with or without rolling basket attached to the back. Using the rolling basket in this study was the idea of Tom Kilcer, collaborator on the project. Kilcer recently retired from Cornell Cooperative Extension of Rensselaer County and now works as an independent consultant. Kilcer was

interested in seeing if the rolling basket would increase manure incorporation by the Aerway.

### On-Farm Research

Farmers learn a lot from participating in studies on their own farm. "They get to see for themselves the end results which will and do affect their management decisions as they integrate the results into their farm practices," said Kilcer. This is easy to see with Dutch Hollow Farm, where the economic component of the trial plays a large part in providing options for their field practices.

"We are looking for ways to save money," said Chittenden. "So by being involved in this study we can find-out if there is a difference between the deeper tillage versus minimum tillage and how much we can possibly save."



Brian Chittenden (left) talks with Tom Kilcer (right) during harvest of the 2008 manure application plots at Dutch Hollow Farm.

The field that Chittenden ended up using for the manure management study was actually one of the worst fields on the farm. The field had not received manure in almost forty years. "If there were any fields that could

really test the different incorporation treatments this was the best one for the job," Kilcer remarked.

Quirine Ketterings, Associate Professor of Nutrient Management in the Department of Animal Science at Cornell and leader of the NSMP, explained, "With the 8,000 gallons per acre application rate that was used we estimated we had applied about 70 lbs of P<sub>2</sub>O<sub>5</sub>, 170 lbs of K<sub>2</sub>O, and 40 lbs of available N per acre where manure was not incorporated versus about 110 lbs of nitrogen per acre with incorporation".

"Last year the plots where manure had been incorporated yielded on average two tons per acre more than the plots where the manure had not been incorporated and there was no yield difference between the different incorporation treatments", Chittenden said.

Soil nitrate and stalk nitrate measurements confirmed a shortage of N where manure had been surface applied, explaining the 2 ton per acre difference in yield. "The plots where manure had been incorporated yielded more because the incorporation conserved a large portion of the nitrogen in the manure and this field really needed the extra nitrogen", Ketterings said. "Judging by the soil and stalk test results, in this location, we could have used a higher manure application, reflecting that this field had not received manure for the past several decades."

### Farm-Level Impact

Although just in its second year now, this study is already having an impact at the farm level. "This study affects farms in two ways," Kilcer said. "First, there is a savings of approximately \$50 per acre in nitrogen fertilizer cost and the concurrent reduction of smell noticed by neighbors. Second, an increasing number of farmers are finding that it is an excellent tool to prepare seedbeds without bringing up many stones."

This spring Chittenden used the Aerway on a majority of his ground citing labor costs as one of the most obvious challenges. "My

nephew can run the Aerway, but if I use the chisel it means I have to hire someone to do the work which adds more to the overall costs." Chittenden also noticed the greater drying effect the Aerway had on the soil compared to the plots where manure was not incorporated. As Kilcer mentioned, "Brian noticed the drying effect in the 2008 trial and used it in the 2009 season. This has huge potential in widening the tillage window available for farmers."

An important asset of the project is that the trials are conducted on commercial farms. Kilcer remarked, "For research to be applicable to farmers in New York State, it is important to have a large number of research tests conducted on a wide range of soils and climatic conditions." This works as a verification for the farmers as well as the researchers. It gives them both the chance to test results of trials conducted at research farms.

Kilcer participated in on-farm research for many years. "By being involved you know the field conditions that everything happens under. It's more representative of what is likely to happen when the work being done is based off the farmer's schedule and can't always be done in ideal conditions."

Kilcer used the results gained from this study to increase awareness of the benefits that can be gained using shallow incorporation. "We publicized the results in talks this past winter and in articles. I have brought it up with a large number of farmers as a key method to capture their nitrogen. And it convinced other farmers to try this out on their own farm."

Chittenden agrees with Kilcer, "You can physically see the results and draw your own conclusions to adopt the practice or not."

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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://nmssp.css.cornell.edu>) or contact Quirine Ketterings at [qmk2@cornell.edu](mailto:qmk2@cornell.edu) or (607) 255-3061.