Central New York Dairy Farm Family Reaps Benefits of Manure Management Trials

By Sara Zglobicki

For the Place family of Hohl Acres, farming is a family affair. In 1948, Martha Place's mother purchased the rocky, hilly land where the farm lies today. Martha and her husband Richard raised their three children Joseph, Anne and James on this farm. These days, it is home to Martha, Richard and James along with 34 milking cows and 32 Scotch Highland cattle.

As a Cornell University graduate student working on her Master's degree in soil and crop sciences, Anne Place finds herself sharing new ideas with her family to improve farm management through research. Anne is working with the Cornell Nutrient Management Spear Program (NMSP), the applied nutrient management research and extension program in the College of Agriculture and Life Sciences, to examine manure application alternatives for dairies with reduced tillage systems. Funding from the New York Farm Viability Institute (NYFVI) and the Northern New York Agriculture Development Program (NNYADP) allowed the team to implement ten farm trials throughout New York in 2008 and the project will be continued in 2009.

Anne Place is working on the manure incorporation study as part of her Master's thesis at Cornell University.

The purpose of the research project is to compare corn yield, forage quality, energy and labor use, and crop production costs in plots where surface-applied manure is (1) not incorporated, (2) incorporated shallowly with an aeration tool (Aerway), or (3) incorporated with a chisel plow. At one location, a comparison is done with injection.

The current project sprang from three years of trials examining manure management options for corn at the Aurora Research Farm in Central New York. Altria provided funding for the first year of trials while the NYFVI funded the subsequent two years of work. This research showed that shallow mixing and chisel plow incorporation immediately following surface manure application were equally effective at conserving ammonia-nitrogen (N). The only yield difference showed up in the final year when Aerway incorporation resulted in higher yields, most likely due to greater moisture conservation in the dry growing seasons that year.

"Richard and Martha and many other farmers are looking for ways to make better use of manure to reduce their fertilizer input costs", said Quirine Ketterings, Associate Professor of Nutrient Management in the Department of Animal Science at Cornell University and leader of the NMSP. "Farmers are also interested in reduced tillage systems to lower fuel costs and conserve organic matter. The challenge comes when applying manure in such reduced tillage systems as surface application without some form of mixing with the soil will reduce the nitrogen value of the manure to no more than 20% of the total mount of nitrogen in the manure."

The results at the Aurora Research Farm were very promising but on-farm trials were needed on other soil types and under different weather conditions. As Martha Place explained, "Just because something works on the Cornell research farm doesn't mean it will work on our farm. If ten farms in a project find they have positive results, it helps farmers see

that the technique is reliable in a variety of environments. "

A good match

"We wanted to test the compatibility of Aerway aeration following manure spreading on farms of all sizes," said Anne. So when a small farm scheduled to participate opted out, Anne turned to her family, who has employed no-till techniques for the past 12 years.

Richard and Martha's adoption of no-till agricultural techniques just made sense on their farm. Of the 95 cropping acres at Hohl Acres, 60 are well-drained gravel ground and many fields are sloped. While the Places first plowed and disked their land, they found themselves spending a lot of time picking rocks. They then switched to minimum tillage with a chisel and plow. Finally, they decided even this tillage regimen was too intensive.

"We had strip cropping in narrow segments along our slope, but turning machinery around often on tight curves was a challenge," said Martha. "Eventually, we were convinced that with the slopes we had on our farm, we needed to try no-till. Since then, we've increased our corn yields and decreased the number of trips we make across the field," said Martha.

With the Place's current no-till practices, manure is surface applied with no incorporation, resulting in a loss of much of the nitrogen in the manure. Richard and Martha learned from Anne that surface incorporation of the manure with an Aerway was shown to conserve nitrogen to the same extent as chisel incorporation, minus the intensive soil disturbance. They were excited to see how this less intensive form of incorporation could help them utilize manure nutrients wisely while still maintaining very minimal tillage on their farm.

Manure Application Trial at Hohl Acres

For the trials, liquid manure was imported from a nearby farm so that it could be applied to all plots immediately prior to planting 3rd year silage corn last spring.

The soil was sampled at planting, sidedress time, and harvest. Soil moisture was measured each time, while both the Illinois Soil N Test (ISNT) and the Presidedress N Test (PSNT) were used to analyze samples taken mid-season. The researchers collected yield data and sampled for forage quality as well as the Late Season Stalk Nitrate Test. Each farm received a farm-specific research report with the results of their trial. They also received a summary of all ten trials in the project.

"The collaboration between the researchers at Cornell, Anne and Richard and I has been great," Martha commented. "Anne's input has been very informative; she's kept us up-to-date on what's happening and explained the 2008 results of the project."

First Year Observations

Even though the field was hit by three hail storms and there were planter malfunctions during the 2008 growing season, there were important observations. For example, Richard found he only needed to use their 100 horsepower tractor for the Aerway, not the 150 horsepower tractor used for the chisel. These horsepower savings lead to fuel savings."

The 2008 trials have helped the Places recognize manure as a valuable fertilizer as well. As Richard noted, "Manure from our neighbor's farm is free, all we have to pay for is trucking."

It is likely the Places' experience in 2008-2009 trials will inspire management improvements on other farms. "Fuel prices are increasing, so reducing trips across the field will make sense as farmers seek a newer, more efficient way of doing things," said Martha. "Other small farms don't have storage for liquid manure so it might be cost effective for small farms to import manure from another farm to spread."

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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.