Timing is Right for Manure Incorporation Study at Mapleview Dairy LLC in St Lawrence County

By Sara Zglobicki

"Whatever can help me be competitive, grow the best crops, improve or learn how to do the best for the cows is exciting." A simple statement of how Dave Fisher of Madrid, NY continuously seeks new knowledge to add to all he has learned about farming from his family at Mapleview Dairy LLC.

Mapleview is located about 15 miles from the St Lawrence River, in Madrid, and lies on land that has been in Fisher's family since the 1800s. Currently they milk 1900 cows and crop over 3500 acres of silage corn, alfalfa/grass mix, grass, soybeans and rye on soils that range from clay to sand.

Last year, Fisher began hosting trial plots as part of a two-year manure application study. The study is organized by the Cornell Nutrient Management Spear Program (NMSP), the applied nutrient management research and extension program in the College of Agriculture and Life Sciences at Cornell University. The New York Farm Viability Institute (NYFVI) and the Northern New York Agriculture Development Program (NNYADP) funded the study that involves ten farms throughout New York State.

Pete Barney (left) and Dave Fisher (right) at harvest time for the manure application trial at Mapleview Dairy in Madrid, New York.

At Mapleview Dairy, the research project compares corn yield, forage quality, energy and labor use, and crop production costs in plots where surface-applied manure is (1) incorporated with a chisel plow, (2) incorporated shallowly with an aeration tool, or (3) surface-applied with no incorporation.

The trials are coordinated by Anne Place, Soil and Crop Sciences graduate student who has been working with the NMSP the past year and a half. "These on-farm trials are beneficial for both the farmer and for us as researchers," said Anne. "It gives the farmers a chance to try new methods on their farms and receive valuable results we can all use to develop and evaluate best management practices."

Timing is Right

Fisher heard about the manure application study from Pete Barney, at the time field crops extension educator with Cornell Cooperative Extension (CCE) of St Lawrence County. Barney retired from CCE but remains involved as independent agricultural consultant and staff member of the NMSP. "Dairy farms generate manure that has tremendous value. This study is great in showing why we need to manage manure for environmental reasons, like preserving water quality, and for economic reasons," observes Barney.

Over the years, Fisher shifted from frequent use of plows, chisels and discs, to less frequent use of a field cultivator. Interest in improving soil health coupled with a desire to lower the cost of fuel and an openness to change triggered Fisher's interest in participating in the manure incorporation study.

Quirine Ketterings, Associate Professor in the Department of Animal Science at Cornell University and leader of the NMSP continues, "With the increased costs of fertilizer and fuel, we need to find more sustainable ways to use on-farm nutrient sources such as manure. This means we need to look for ways to conserve soil carbon, reduce erosion, leaching and runoff losses, and conserve nitrogen from

manure. Shallow incorporation using aerators has the potential to reduce nitrogen losses and retain more surface residue without the need for aggressive soil tillage." Ketterings adds, "Our research station trial showed great promise for aerators as manure incorporation tools but we needed to test this on commercial farms with a diversity of growing conditions and soil types. Our project with Dave and nine other New York farms sprang from this need."

2008 Season Results

In the 2008 growing season, there were no significant differences in corn silage yield, nor in silage quality indicators like moisture content, NDF (neutral detergent fiber), protein, starch, lignin, and estimated milk production, between the aerator and chisel plow treatments or the surface application without incorporation at Mapleview. "The average yield across all treatments was 20.6 tons/acre at 35% dry matter," Place reports.

The soil and plant nitrogen tests that were done as part of the study explained why no yield differences were seen between the incorporation treatments and the surface application. "The Illinois Soil Nitrogen Test (ISNT), the Pre-Sidedress Nitrate Test (PSNT), and the Late Season Corn Stalk Nitrate Test (CSNT) all indicated there was already enough N from soil organic matter for the crop. No additional N was needed for this field. As a result, even though the surface application of manure without incorporation causes nitrogen volatilization losses, we saw no yield differences between the manure application treatments," Ketterings explains. "We did see higher yields with both aerator and chisel incorporation at farm-trials where the loss of N from the surface application resulted in a nitrogen deficiency. And, in those trials, the aerator did as good a job as the chisel plow with conservation of the nitrogen from the manure."

While comparing the two incorporation tools at his farm, Fisher noticed there was less fuel and horsepower required to pull the Aerway® versus the chisel plow. Fisher says, "Over the chisel, we're saving probably a couple gallons [of fuel] per acre. After trying out the Aerway® for the first time last year, 60% of manure applied this year was incorporated with the Aerway®. "Yields are at least as good as last year," Fisher added.

Benefits of On-Farm Research

As an extension educator, Barney was a key player in making research findings accessible to farmers and ensuring research relevancy. He emphasizes the importance of the team-based, on-farm, research approach used by the NMSP. "Good working relationships between the university, extension and farming communities are essential. This ensures success for all parties involved, including the private sector." As Barney continued, "These types of projects are multipliers. People will learn from their experiences with the research, and will pass that on to anyone they interact with."

For Fisher, involvement with research is nothing new. As Barney, whose family has been working with Fisher for over 45 years, comments of Fisher, "I have respect for what he does with the farm. He's very innovative and is always willing to look through research and see where it fits his operation."

"This study brings up questions for me about what is happening on the other farms in the trial." Says Fisher, "I like to learn how to do things better and cheaper. I've always done projects with Cornell Cooperative Extension, whether with cows or crops. I learn from the people who come out to the farm, and our employees learn too."

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NMSP Cornell University Cooperative Extension PRO-DAIRY

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.