

## MANAGING MANURE

By Lisa Fields

# Manure rate research partnership with NMSP is valuable to farm

The dairy industry's viewpoint about manure has evolved significantly over the past twenty years. Dave Russell, a senior consultant with the Linwood Management Group, has experienced that progression firsthand. Russell manages Southview Farms' 2,800 acres of crops in Wyoming County, NY. He also works part-time for Agrinetix, LLC, precision agriculture technology consultants.

"Twenty years ago manure was mostly viewed as a waste product," Russell said. "Now we view it as a resource that not only can save fertilizer expense, but can potentially help us be profitable."

That outlook is reflected in Southview Farm's participation in the 2013 Manure Application Method and Rate Study with Cornell's Nutrient Management Spear Program (NMSP).

"The idea for this project came from earlier work we did with Willard DeGolyer and the farm crew of Table Rock Farm in Western New York," said Dr. Quirine Ketterings, director of the NMSP. "The farm crew questioned whether or not manure application methods affected corn yields and if higher or lower rates made a difference in yield. These questions were raised by others as well, so we approached the New York Farm Viability Institute (NYFVI) for funding for the study."

The manure application methods compared were injection and tillage-incorporation with a separate component examining the effects of different rates of manure. The

**Yield impacts of manure application methods were compared.**

study evaluated the impact on both yield and forage quality. Economics of the two manure application methods were evaluated by John Hanchar, Farm Business Management Specialist with the Northwest NY Dairy, Livestock and Field Crops Extension Team.

"It fit our continual goal to spread manure in an environmentally friendly manner and to get the most from it as a nutrient source," Russell said about Southview's participation in the manure

rate segment of the project. "Our predominant method of applying manure has been by injecting it in the spring through a tractor pulled tanker before planting the corn crop. With injection we capture the ammonia-N and as a result, have cut nitrogen fertilizer by at least 30% compared to the past practice of surface spreading manure. The question we asked of the NMSP study was whether our rates of application gave the most efficient use of nutrients and met our manure management needs."

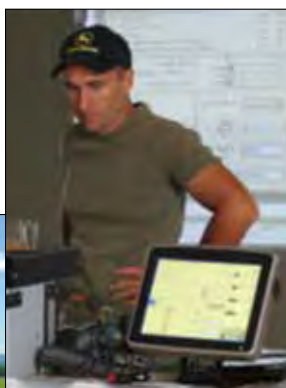
Ketterings said, "We were able to conduct rate studies at four farms across the state and were happy to work with Dave at Southview on this project. The farm's investment in yield monitoring equipment allowed us to compare labor and time involved in doing these on-farm trials."

The trial was a collaboration between the research team and the farm crew. "The NMSP team set up the plots and our field crew applied the injected manure in four replications each at three rates of 9,000, 12,000 and 15,000 gallons per acre. It went really smoothly and required no extra time on our part," Russell said. "Harvest was a little slower than usual because of the individual plots, but it was well worth the effort."

The results showed that in Southview's study plots the lowest rate met the corn crop's N needs, with no significant difference in silage yields between the three treatments. Average yield in the study plots was 22.5 tons per acre at 35% dry matter.

"I honestly couldn't see a difference in height or density between those three rates, and the yield monitors agreed," Russell said. "The highest rate contributed more phosphorus and potassium to the soil than is ideal for long term nutrient management. We need to keep the nutrients in a range that meets crop needs without building levels of P and K too high so we can continue to apply manure to those fields."

An added component of the project was to compare time involved for harvesting of trials using a yield monitor versus on-farm scales.



Dave Russell, senior consultant with the Linwood Management Group, crop manager of Southview Farms, and part-time employee of Agrinetix, LLC, participated in a manure application and yield monitor evaluation study.

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at a White House press conference. "Later, I was invited to give a presentation about the Nutrient Boom to 25 senior staffers from the EPA and USDA in Washington, DC. That was quite encouraging," he said.

The Nutrient Boom saw its first public use in 2013 at two Ohio State Extension field days, and in 2014, with a field trial in Ohio and on a NY dairy farm. The Ohio Corn Marketing Program and Ohio Dairy Marketing Research Fund sponsored the boom through Glen Arnold, Ohio State University Extension Nutrient Management Field Specialist.

"Getting the Boom in the public eye was a big step toward building interest in this concept and showed us some needed adjustments," Young said. "My son Drew worked with two booms in Ohio and learned what needs to be monitored and when. He developed an efficient set-up procedure from arrival at the field with the equipment to pulling the boom into the field ¼ mile, getting the pumps going, ready to distribute nutrients."

Mechanical and control system adjustments to the Nutrient Boom are planned for this winter.

"We changed the bushings on the fold seams of the boom, and fit a commercially available grinding unit to our pump," Young said. "That took care of any trash larger than the 1.25 inches that the pump can currently handle. A challenge we encountered in Ohio was very wet weather on clay soils. A solution for using it in those conditions could be having a cover crop so the tires are moving over sod residue instead of exposed soil."

The NMSP, led by Dr. Quirine Ketterings, is working with Young to help evaluate the invention. In 2014, they gathered data from the Patterson Farm in Cayuga County, where the boom was used in a corn field with tillage treatments split between no-till and zone-till.

"It is great to work with Doug on evaluation of this new technology," Ketterings said. "This year, we compared side-dressing of manure with application of water at the same rate to evaluate the benefits of manure beyond application of water. Additional work is needed, but if manure can be applied to a growing crop like corn, it not only benefits the environment, but it can also enhance crop production. It would also allow for quicker planting of corn in the spring. The approach Doug has taken with this unit addresses compaction issues that could occur with tanker-based manure applications in wet springs as well."

"I view the Nutrient Boom as a tool to help take nutrient management to the next level of efficiency. That drives me to keep at it, addressing the challenges to achieving optimal function as they arise," Young said. "Getting a system on the ground that can deliver manure in an environmentally sound manner without compacting the soil is a major breakthrough. Protection of the soil resource is necessary for carbon sequestration and that's the goal we need to achieve." ■

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Russell described the current and potential role of yield monitors. "Our John Deere forage harvester has a HarvestLab® monitor that measures by-the-second as you harvest," he said. "Given weather impacts on crops, you should view three to five years of field data to determine any trends. With yield maps layered with soil and fertility maps, you can accurately determine whether or not yield differences are due to variations in the field. That takes much of the uncertainty out of field research results. If we upgrade our technology in the future for variable input applications, we've got the baseline field data to use it effectively."

As Southview's farm management team looks to the future, they're discussing manure injection options. "Tanker weight can lead to soil compaction, which we could avoid with a drag hose system," Russell said. "We have one drag hose set-up now but we'd need a second one to make a complete shift. The advantage is protection of the soil to continue good crop performance. As the equipment is a major investment, all the pros and cons must be weighed through the team process. I sat down with John Hanchar to compare the economics of the two systems. The drag hose system looked better close to home. We're still gathering information to learn if that's true on farther away fields given the factors of travel time and equipment set-up."

"I met with Dave to gather data for a Partial Budget Analysis," Hanchar said. "The purpose of the analysis is to estimate the expected change in profit associated with a proposed change in the farm business. The analysis includes only the income and expense items that are expected to change. When comparing two manure handling systems, machinery and all related expenses, labor and fertilizer expenses, and possibly corn silage yield, and income will typically change."

The partial budget is an analysis of those common items distilled to reflect expected differences in income and costs attributed to the proposed change in manure handling system. The economic analysis is in its final phase, so conclusions can't be stated yet.

"Economic analysis is part of a whole farm approach to decision making that involves many other factors," Hanchar said. "It's always rewarding to work with people like Dave and businesses like Southview Farms that take the initiative to seek out financial analyses for the decision making process."

Russell summarized the relevance for Southview of NMSP's manure rate study.

"It gave us the opportunity to acquire sound data on crop performance under the three manure rates we typically use," he said. "Documenting the correlation between those rates and soil P and K levels at the end of the growing season was highly useful to our nutrient management program. We will definitely apply the data to deciding on field specific manure rates." ■

*Lisa Fields was a Cornell Cooperative Extension Agriculture Educator in Schoharie County, NY from 1993-2004, followed by several years as a self-employed consultant in Agronomy and Farm Business Management. A lifelong resident of NYS, she relocated to New Mexico in 2012 where she continues to enjoy writing for the NMSP under sunny skies and surrounded by the spectacular Gila National Forest.*