



N Research Helps Dairy Best Use its Manure

A research project on precision nitrogen (N) management in corn, coordinated through the Cornell Nutrient Management Spear Program (NMSP), helps Beck Farm make the best use of manure from its more than 1,000 dairy cows.

“For 2,000 acres (of crops) we don’t have enough manure to meet our N needs,” said Jerry Collier, the crop manager for the Tompkins County, N.Y., dairy. “For us, we need to best use manure.”

How did an N research project solve Beck Farm’s problem? “We found out that sod actually provides more N than we thought,” Collier said.



Janice Degni, field crops specialist with the South Central New York Dairy and Field Crops Team, stands in front of a 19 ton corn silage crop at Beck’s farm in Freeville, N.Y. This was first year corn grown in 2005 with just a small starter N application and no additional manure.

Prior to the research, the dairy treated sod like the field had been in continuous corn and

applied 8,000 gallons of manure spring and fall, Collier explained. “With the research results, we knew we could direct manure to where we can better use the nutrients in the manure.”

The statewide N research in first-year corn brought together a team that included Cornell University faculty, staff and students; Cornell Cooperative Extension educators, such as Janice Degni who recruited Beck Farm for the research; and dairy producers. The research hoped to answer this question: Does corn for silage following hay fields in rotation need nitrogen fertilizer to maximize forage yield and quality?

“We set out to test if we needed starter and sidedress N for corn silage here in New York and looked not just at dry matter yields but also silage quality and N-use efficiency,” said Joe Lawrence, a graduate student in Cornell’s Department of Crop and Soil Sciences who spearheaded the research as part of his Master’s thesis.

The research provided a comprehensive dataset because as a statewide project, it included a variety of soil types and climate conditions. There were 16 field trials on farms, such as Beck Farm and at research stations in 2005 and 2006.

“Working with Cornell Cooperative Extension offices and producers around the state in conjunction with research farm trials is vital,” said Lawrence. “Without the on-farm component, it would be very difficult to get a large enough dataset together, and we would not be as effective in getting our message out.”

Just as Cornell researchers value Extension’s participation, Extension field crops specialists benefit from the opportunity to participate in a statewide project that involved farmers with whom they work.

“It is always good to have something a farmer can see in the field and then have it backed up with scientifically based research,” said Degni, field crops specialist with the South Central New York Dairy and Field Crops Team. “It’s always positive for researchers to be in touch with farmers, and it lets farmers see and interact with the researchers.”

Without the collaboration between Extension and Cornell researchers, Degni said she could not do work such as the N in corn research. "Without Quirine's (Ketterings) resources, we couldn't put research out in the field," she said.

Ketterings agrees. "Such projects establish and strengthen collaboration among producers, Cornell Cooperative Extension, Cornell campus faculty, staff and students, agribusiness, consultants and agencies on issues of importance for the sustainability of agriculture in New York and in each of the counties," said the leader of NMSP and an Associate Professor in Cornell's Department of Crop and Soil Sciences.

Economic and environmental benefits

The research focused on determining under what situations extra N would benefit corn silage yield and quality and where it would not be beneficial, helping farmers to make sound decisions on N use. With the increasing cost of N, that knowledge is critical to New York dairies that grow approximately 990,000 acres of corn of which in 520,000 acres was harvested for corn silage in 2005. Applying only what the crop needs saves money and helps prevent N losses to the environment.

The research sites had sidedress N at zero, 50, 100 and 150 pounds per acre. All sites had 30 pounds of N per acre applied in the starter fertilizer. The findings: Additional fertilizer beyond the small starter application did not increase the yields of first-year corn regardless of tillage, the timing of sod kill, or the amount of grass or legume in the sod, Lawrence said.

Armed with that information, Beck Farm now uses 30 pounds of N in the starter on corn into sod and is reconfiguring its manure applications, planning on reaching more distant fields. "We used to sidedress N but thought there was no benefit, so we stopped that in the

last three years," Collier said. "We also used to use the presidedress nitrogen test but felt it had inaccuracies for first year corn."

The N in corn research also looked at the PSNT and determined it is a waste of time and money in first-year corn since there's no response to sidedress N.

Collier is comfortable with making changes to the farm's fertilizer program for corn silage based on the research. "When the research is done on our own ground with our own practices and in our climate, we're more confident with the results," he said.

Partnering for improved practices

A large part of the funding for the N in corn research came from the New York Farm Viability Institute (NYFVI). Its support for applied research projects such as this one is essential, said Ketterings. "Without such support, we would not be able to deliver on stakeholder requests for local and applied on-farm research."

"New York Farm Viability Institute is committed to funding practical research projects that result in increased farm profits and provide models for other farms to follow," said Thomas Sleight, NYFVI executive director. "Precise application of nitrogen to field corn has the potential to reduce the cost of fertilizing where it is not needed and reduce environmental impact without hurting crop yield."

By Eleanor Jacobs



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The **Nitrogen for Corn Project** was initiated to evaluate the need for starter and side-dress N for corn following plow-down of grass or legume sods. Cornell University's Nutrient Management Specialist Program (NMSP) faculty and staff, PRO-DAIRY staff and Cornell Cooperative Extension educators worked together to conduct 16 first year corn trials and 12 second year corn trials on-farm and on Cornell research stations in 2005 and 2006. The project was funded with grants from the New York Farm Viability Institute (extension-industry grant), the Northern New York Agricultural Development Program (NNYADP, for NNY sites in the project), and federal formula funds (feed quality component). The results of the first year corn trials show us that (1) no additional N beyond a small (30 lbs N/acre) starter is needed for optimum yield and quality of first year corn, independent of sod composition or turnover time – fall vs. spring, and (2) we can skip the PSNT for first year corn. As for second year corn sites, five of the twelve sites showed a significant yield increase, with the average optimum economic N rate ranging from 90 to 110 pounds of N per acre, plus the 30 pounds N per acre as banded fertilizer. The other seven sites did not show a yield response upon side-dress N addition. This included a field that yielded 30 tons per acre in the second year following spring plow-down of a 20% alfalfa sod and no manure or side-dress N. We are currently evaluating 6 management tools that might help identify fields that don't need the additional N.