



Saving Time and Money

By Kate Birchenough

When Andrew Lewis, farm supervisor with Cornell University Farm Services was approached by Quirine Ketterings, leader of the Nutrient Management Spear Program and associate professor in the Department of Crop and Soil Sciences at Cornell University, about a research project on nitrogen (N) needs for corn in a sod-corn rotation, he eagerly agreed to participate.

"We crop 1,000 acres of land around campus, providing feed for Cornell animals and keeping some land open and available for research use. Our crop rotation included corn, which is why Quirine was interested in having us participate," said Lewis. "She wanted one of our production corn fields at the Mt. Pleasant Farm to be a test site for the N project and I was interested in the results as well."

So with two interested parties, the N research at the Mt. Pleasant Farm began.



Andrew Lewis, farm supervisor with Cornell Farm Services.

Graduate student Joe Lawrence, a Jefferson County native, worked with Ketterings and Karl Czymmek of PRO-DAIRY, to conduct the research with sites at the Mt. Pleasant Farm as well as other locations throughout New York.

"One of the many questions farmers asked about fertilizer N needs is whether a sod would supply enough N to the following year corn without needing extra fertilizer," Lawrence said. "My graduate research focuses on this question and tools that could help us identify when additional N is needed and when not."

"We also needed to quantify the impact of reduced N use for first year corn on quality of silage," Ketterings added. "Most studies looked at dry matter yield only".

Lawrence referenced scientific literature that describes numerous field trials with corn grain following a legume in the rotation but there were only a few studies that looked at N needs for corn silage following grass or mixed legume-grass sods.

"There was already a suspicion that the first year corn didn't need extra N beyond a starter, but to that point, we did not have any hard evidence," Lewis concurred.

"There was always the knowledge that there was some N benefit for corn following hay, but research was needed to quantify by how much N applications could be reduced," Lewis said.

That first year, results of the trial at the Mt. Pleasant Farm showed that with a grass sod turned over in the spring, 30 pounds of starter N per acre was enough for a 19 ton/acre silage yield; adding more nitrogen at sidedressing time did not result in higher crop yields.

"We had 16 first-year corn trials in 2005 and 2006, and not one of them responded to sidedress N, showing that also the grass sods that were killed in the fall provided enough N for next years corn crop," Lawrence said. "Silage quality wasn't impacted either".

A typical Farm Services crop rotation included two years of corn, followed by barley in the spring and then winter wheat and four years of Timothy hay.

At the Mt. Pleasant site, second year corn yielded almost 20 tons of silage in 2006 but it needed 100 lbs N/acre beyond the 30 lbs in the starter application to give yields similar to first year corn grown in 2005. With just a starter, the site yielded only 14.5 tons silage per acre, showing much higher production costs for second year corn.

"We saw this need for extra N at five of the twelve second year corn sites in the study. At the Mt. Pleasant Farm, the corn really needed the extra 100 lbs of N," Lawrence added.

"The data quantified something we had seen at the farm, that second year corn fields need more N." Lewis said.

Lewis said the research findings showed him that he and his farm staff could save some time and money on fields that are first year corn after sod; now they are only out on a first year corn field when they plant and apply the 30 pounds of N as starter fertilizer, without going back at sidedressing time.

"The result of the study also convinced us to go to one year of corn in our rotation," said Lewis.

"There is a cost savings there as well as environmental benefits. We make decisions like any farmer, based on efficiency, the environment and money. The data showed with one year of corn, we could win on all three accounts, which is a very good situation. I want to make things as efficient as possible and the change we made based on the project results makes us a better operation," said Lewis.

For the Nutrient Management Spear Program, an integrated applied research and extension program with a mission to enhance New York's agriculture environmental management, it is important to conduct trials throughout the state, covering different soil types and environmental conditions, and to

work in collaboration with those who manage the crops and/or their advisors.

"Where possible, we design our studies to allow for the largest possible participation," Ketterings said.

"It wasn't difficult to participate in the project. The research was non-intrusive allowing us to conduct business as usual during the busy summer months." Lewis noted.

"During the planting we had to stop a few times to change the starter to on or off for various replications, but that is very simple," said Lewis.

"There was not a great labor requirement from me or my staff. We were informed as the process went on and were supplied with data at the end of each year. So by the end of the first year we had a pretty good idea as to what was going on, even before the official results were released," continued Lewis.

Lewis agrees that on-farm research is key.

"The project was conducted locally making the results locally applicable and the results were very definitive. With N at an all time high, these findings can help producers significantly reduce N application for first year corn. Not applying N to first year corn fields saves us time and money and the environment is a little better off," said Lewis.

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Cornell University
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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 Spear 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 management tools that might help identify fields that don't need the additional N.