



Starter P is a Piece of the Whole Farm System

The New York Starter Phosphorus (P) Project met the high standard Pete Barney sets for his work as a Cornell Cooperative Extension educator in St. Lawrence County, N.Y. That's why he participated in the three-year project and recruited farmers in his area to do so also.

"I liked the concept of the project, of being able to use this to get more farmers to look at the whole picture of cropping," Barney said. "In order to get farmers to understand one part of the system – phosphorus – we had to get them to understand more fully the whole system they're dealing with – manure analysis, soil sampling, equipment calibration."

The New York Starter P Project was initiated in 2000 with initial funds from the Natural Resources Conservation Service (NRCS) to evaluate and demonstrate the value of P starter application on soils testing high or very high in soil P. "For every 3 pounds of P that comes onto the farm each year in feed and fertilizer, about 1 pound goes off in milk and the rest ends up on fields," says Karl Czymmek, PRO-DAIRY team member and an early promoter of the research.

"Did we need to continue to add fertilizer to fields with increasing soil test P, when quite a lot of P was also being applied in manure? We believed that there was an opportunity to reduce phosphorus fertilizer inputs on some fields without hurting yields and wanted to find a way to get this message to producers while doing good science along the way."

Following the first year, grants from the Northeast Region Sustainable Agriculture Research and Education (NESARE) program and the Northern New York Agricultural Development Program, as well as donations from Agway, Carovail, Pioneer Hi-Bred International Inc., and AgriCulver Seeds, allowed Cornell University's Nutrient Management Spear Program (NMSP) faculty and staff, PRO-DAIRY staff and Cornell Cooperative Extension educators to collaborate and conduct 65 on-farm and 13 research station trials between 2001 and 2003.

Barney had 12 on-farm trials over the course of the project. There are two important benefits of this approach: Barney could work one-on-one with farmers. And on-farm research provides a "wider range of conditions versus a research farm," he said.

The collaborative approach integral to this research project, which engaged Cornell University researchers, Extension educators and farmers, benefits everyone involved, Barney said. "It's good for Extension educators and good for Extension

associations because people see that we're involved and out on farms. They see people getting things done in the field that they can use."



Pete Barney, St Lawrence County Cornell Cooperative Extension Field Crops educator, has worked with many producers in the county to conduct on-farm starter phosphorus trials as part of the New York Starter Phosphorus Project.

In addition, through a team approach the Starter P Project created a greater level of cooperation between Extension field staff and Cornell researchers. "This was an opportunity to work as a team with researchers and field staff," Barney said. "It showed that when we drop barriers between field staff and university people and just attack a problem, we can get a lot done."

Similarly, Quirine Ketterings, leader of the NMSP and faculty member in the Department of Crop and Soil Sciences at Cornell University, points towards the tremendous benefits of the collaboration with local extension offices:

"Our applied research and extension mission in the Nutrient Management Spear Program is not only

to conduct research and facilitate technology and knowledge transfer but also to aid in the on-farm *implementation* of strategies for crop nutrient management that are economically sustainable and environmentally sound," she said.

"To address that mission, we need to conduct research on both our experimental stations and on farms throughout the state. We simply cannot do that without collaborating with local Extension offices, producers and consultants.

"It would have taken us 10 to 15 years to generate a dataset that would have been big and inclusive enough to address the questions that the producers asked us to address. And, we certainly would not have had the kind of impact that the Starter P Project has had on producers and their advisers to date without having trials on-farm."

Benefiting farms

Clearly, the Starter P Project had environmental and economic benefits for farmers. The research showed that corn silage yields were not negatively impacted when fields testing high or very high for P did not receive additional P in the starter. Also leaving P out of the starter did not impact the quality of the silage.

Using less P in the starter is a "cost-effective way to produce crops with fewer inputs. And it's environmentally sound," Barney said.

Tim Heiden proved this on his Madrid, N.Y., 60-cow dairy. He farms 200 acres, with 70 of it planted to corn. Heiden had two fields in the project for all three years. They were among his few fields that tested high or very high for P. Immediately he saw that his corn's appearance and yields were maintained when planted on first-year sod, plowed down, and with no P in the starter.

Even after the Starter P Project ended, Heiden continued to use soil tests to determine whether or not to add P to his starter. "A year before last, I didn't apply any P in starter for a whole field that tested high, and I got 20 tons of silage per acre. That's the yield the soil tests indicated we'd get. From what I've seen, I'm going to try this again on 10 acres that we've manured this winter and will plow down in the spring."

If fields test high for P, eliminating it from the starter "is definitely what should be done," Heiden said.

He figures he has probably saved \$200 on fertilizer cost by eliminating P in his starter for some fields. He realizes that if he can save on fertilizer and maintain his silage yields, it's a win-win.

Dave Fisher, another Madrid dairy producer, also participated in the Starter P Project. "The bottom line is we've pretty much eliminated phosphorus or cut back significantly on it," said Fisher, who grows about 1,000 acres of corn.

Fisher has always had the advantage of manure storage, which has allowed him to spread manure evenly over his dairy. Consequently, fields generally don't test very high for P but more in the moderate to high range, he said.

Prior to the phosphorus trials, Fisher used a 10-34-0 fertilizer. Today, he's more likely to use a 32-0-0. "It's obvious that N does more than P," he said. "We drizzle a little P with the N in the row."

Like Heiden, Fisher has seen no loss of yield or silage quality due to changing his fertilizer program to minimize P or eliminate it.

The two dairy producers aren't alone in their thinking. Barney saw producers becoming much more receptive to Cornell's starter P guidelines since the project began. Approximately 15 farms in St. Lawrence County have eliminated P, or significantly reduced it, where fields tested high or very high, Barney said.

He is seeing two other changes: There is more use of fertilizer blends to lower P and more use of liquid fertilizer to control P amounts.

To alert farmers in his region to the results of the New York Starter P Project, Barney wrote about the project in the St. Lawrence County Cornell Cooperative Extension newsletter. Information was also presented at Corn Congress. And participating farmers talked with others about the positive impact of reducing P on fields that tested high or very high for phosphorus.

"Participating producers influenced maybe 10 others to reduce fertilizer," Barney said.

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The **New York Starter Phosphorus Project** was initiated to evaluate and demonstrate the value of P starter application on soils testing high or very high in soil P. Cornell University's Nutrient Management Spear Program (NMSP) faculty and staff, PRO-DAIRY staff and Cornell Cooperative Extension educators worked together to conduct 65 on-farm and 13 research station trials between 2001 and 2003. The project was funded by a NESARE research and education grant (LNE02-173) and contributions from New York State Natural Resources Conservation Service, Agway, Carovail, Pioneer Hi-Bred International Inc., AgriCulver Seeds and the Northern New York Agricultural Development Program. Based on the results of these three years, we conclude that on sites that test *high* in P and have no manure applications planned for the season, no yield penalty is expected when P starter levels are *reduced* below 25 lbs P₂O₅ per acre. On sites that test *very high* in P or when manure is applied to high testing sites, there is a low probability of a starter P response, and P could be *eliminated* from the starter without a yield or silage quality penalty. For more information, visit: <http://nmsp.css.cornell.edu/projects/starterp.asp> or contact Quirine Ketterings at qmk2@cornell.edu or (607) 255-3061.