

Phosphorus Starter Project – Results of the 2003 Growing Season

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2003 Participating Producers:

Ashland Dairy (Poplar Ridge), Bill Brown (Hammondsport), Ken Burr (Trumansburg), Tim Cantwell (Richfield Springs), Dudley French (Waverly), Gary Gaige (Alpine), Greenwich Central School/William Elsworth (Greenwich), Mark Grocott (Edmeston), Harvest Dairy Farm (Madrid), Tim and Mark Heiden (Madrid), Willy Hughson (Jeffersonville), Bill Kilcer (Genoa), Frank Lampion (Hobart), Maxwell Farms (Geneseo), Kevin McCollum (Canton), Mike McMahon (Homer), Tom and Mike Moskin (Ava), Steve Nemecek (New Hope), Dave Schieferstine (Rome), Sykes Farm (North Branch), John Williams (Carthage), Rob Williams (Waterville), and Marty Young (Cuyler).

2003 Participating CCE Educators:

Carl Albers (Steuben Co), Peter Barney (St. Lawrence Co), Shawn Bossard (Cayuga Co), Peter Carey (Sullivan Co), Janice Degni (CCTTS Area Extension Specialist), Dale Dewing (Delaware Co), Aaron Gabriel

(Washington Co), Kevin Gano (Mohawk Region Area Extension Specialist), Mike Hunter (Jefferson Co), Jeff Miller (Oneida Co), Mike Stanyard and Nancy Glazier (North West New York Dairy, Livestock and Field Crops Team).

Other 2003 Participants:

Elaine Dalrymple (Schuyler Co. Soil and Water Conservation District), Ev Thomas (Miner Institute), Mike Davis (Willsboro Research Farm), and Dr. Adam Khan (Morrisville Technical College).

2003 Sponsors:

NE SARE (project funding), Carovail (fertilizer), Northern NY Agriculture Development Program (Willsboro Research Farm support), Pioneer Hi-Bred International Inc. (seed), and AgriCulver Seeds (gift certificates for drawings at Starter P booth, Empire Farm Days).

Background and Summary of 2000-2002 Results

The NY starter phosphorus (P) project was initiated in 2000 to evaluate and demonstrate the value of P starter applications for corn on soils testing high or very high in P (=9 lbs P/acre on the Cornell Morgan test). With support from USDA-NRCS, a grant from the NE SARE

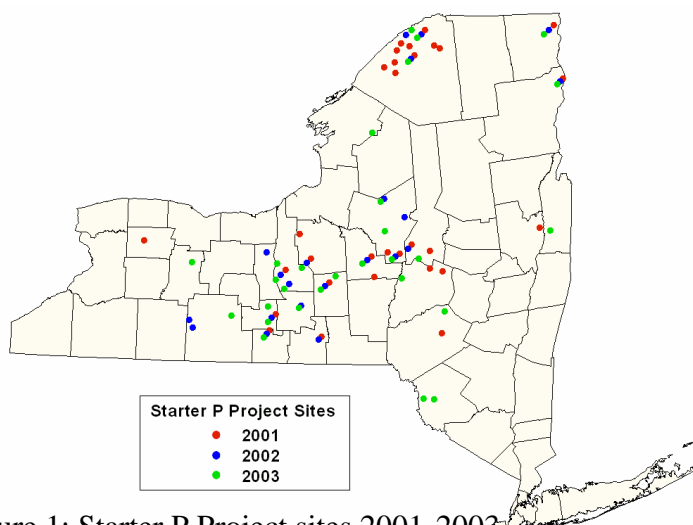


Figure 1: Starter P Project sites 2001-2003.

program, fertilizer donations from Agway and Carovail, seed donations from Pioneer Hi-Bred International Inc., and NNYADP support for the Willsboro Research Farm, 43 on-farm trials and 9 research station trials were conducted in 2001-2002. In the on-farm trials we tested the need for starter phosphorus fertilizer on soil with high or very high soil test P (STP) levels using comparisons of: (1) no starter, (2) no P₂O₅ in the starter, (3) 10-25 lbs of P₂O₅ in the starter, and (4) >25 lbs P₂O₅. On

the research stations we tested: (1) no starter, (2) 200 lbs/acre of 10-0-10 (no P₂O₅), (3) 200 lbs of 10-10-10 (20 lbs P₂O₅), and (4) 200 lbs of 10-20-10 (40 lbs P₂O₅). On average, corn grain and silage yields showed no response to P additions in starter fertilizer. Following the 2002 season, we continued to recommend the application of N in the starter band, regardless of soil test P level, especially when planting occurs early in the season on fields without a recent manure history. We concluded that on sites testing *high* in P, no yield penalty is expected when P starter levels are *reduced* below 25 lbs P₂O₅/acre. When manure is applied to high testing sites or on sites that test *very high* in phosphorus, there is a low probability of a starter P response and P could be *eliminated* from the starter without a yield penalty. The results of the 2001-2002 seasons were reported in earlier issues of "What's Cropping Up?" and are downloadable from the NY Starter Phosphorus Project website: <http://nmsp.css.cornell.edu/projects/starterp.asp>.

2003 Results of Replicated Research Trials (experimental stations)

In 2003, trials were established in four replicates at the Mt Pleasant Farm (Mardin), the Willsboro Research Farm (Cosad), the Musgrave Farm at Aurora (Kendaia), and Morrisville Technical College (Palmyra). The fertilizer blends were composed of urea, monoammonium phosphate (MAP) and potash. The results of the research farm trials are shown in Table 1.

Table 1: Silage yields (tons/acre 35% DM). All plots were sidedressed with 100 lbs N/acre.

Location	STP	P rec.*	No Starter	200 lbs 10-0-10	200 lbs 10-10-10	200 lbs 10-20-10
Mt Pleasant	7	30	18.5 a	18.8 a	19.0 a	17.9 a
Aurora	8	25	20.2 a	20.7 a	21.1 a	20.8 a
Willsboro	19	20	9.4 b	14.6 a	17.0 a	14.6 a
Morrisville	104	0	17.1 a	16.4 a	17.4 a	16.4 a
All	-	-	16.3 a	17.7 a	18.6 a	17.4 a

* Cornell phosphorus guidelines for corn in lbs P₂O₅ per acre.

Note: Average values within rows with different letters (a or b) are statistically different ($\alpha=0.05$).

There were no significant yield differences due to P applications at any of the locations. At the site in Morrisville, the corn grew as well without N application as it did with 20 lbs of starter N and 100 lbs of sidedress N. The latter is not surprising as the site has very high fertility levels due to a long history of manure applications. Starter N+K increased yields in Willsboro while an additional comparison of corn yields without any starter or sidedress N application (12.3 tons/acre in Mt Pleasant, 11.6 tons/acre in Aurora, 9.6 tons/acre in Willsboro) showed all three sites to be responsive to N.

2003 On-farm Demonstration Trials

In 2003, 22 trials were conducted by 12 cooperators and producers in Delaware, Cayuga, Chemung, Clinton, Cortland, Herkimer, Lewis, Livingston, Oneida, Otsego, Schuyler, Steuben, St. Lawrence, Sullivan, Tompkins, and Washington counties (see Figure 1). One trial was harvested for grain corn; all other trials were harvested for silage. For the grain trial, yields were

converted to a silage equivalent by assuming that 1 ton of silage (35% dry matter) equals 5.9 bu/acre of grain (85% dry matter). Treatment means for silage yields for the 2001, 2002, and 2003 seasons individually and the three seasons combined are given in Table 2.

Table 2: Silage yields (tons/acre 35% dry matter) for on-farm trials conducted in 2001-2003.

	2001	2002	2003	3-Year Average	
	(27 trials)	(16 trials)	(22 trials)	High P	Very High P
No starter	16.7 b	15.7 a	20.6 b	17.7 b	19.5 b
N(+K) only	19.3 a	16.2 a	20.7 b	17.9 b	20.6 ab
N(+K) + 10-25 lbs P ₂ O ₅ /acre	19.9 a	16.5 a	21.7 a	19.2 a	21.4 a
N(+K) + >25 lbs P ₂ O ₅ /acre	19.8 a	16.0 a	21.1 ab	18.2 ab	21.2 a

Note: Average values within columns with different letters (a or b) are statistically different ($\alpha=0.05$).

The 2003 results suggest a response to a small amount of starter P (<25 lbs P₂O₅/acre). No additional yield was obtained with higher amounts. The combined 3-year average allowed us to check if responses to banded P were different with early planting versus late planting, with soils testing high in P versus very high, and on manured fields versus fields that had not received manure in recent history. The soil test classification (high or very high) impacted the results; for fields testing high in P, an increase in yield was seen with a modest P application (<25 lbs P₂O₅/acre) while for fields that were very high in P, yields responded to starter N(+K) only (Table 2).

Conclusions

Based on the results of the past three years, we conclude that on sites that test *high* in P

Table 3: Phosphorus guidelines for corn in New York.

Soil Test P	Lbs P ₂ O ₅ /acre	
	With manure	No manure
Very Low	20-30	60-70*
Low	20-30	50-60*
Medium	20-30	25-50*
High	0	0-25
Very High	0	0

* Put ~25 lbs P₂O₅/acre in the starter fertilizer band; balance may be included in the band or broadcast.

and have no manure applications planned for the season, no yield penalty is expected when P starter levels are *reduced* below 25 lbs P₂O₅/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 penalty. Corn responds to N in the starter band more often than P and we continue to recommend 20-30 lbs of banded starter N, even where P is eliminated (Table 3).



Nutrient Management Spear Program

<http://nmssp.css.cornell.edu/>

A collaboration among the Department of Crop and Soil Sciences, Pro-Dairy, and Cornell Cooperative Extension.