NEW YORK STATE
STARTER PHOSPHORUS PROJECT

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Sponsors:

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Starter P Project Trials

To evaluate and demonstrate the value of phosphorus (P) starter application on soils testing High or Very High for soil P, we initiated a state-wide, on-farm starter P project in 2000. These past four years, 75 on-farm trials and 13 research station trials were established and evaluated.

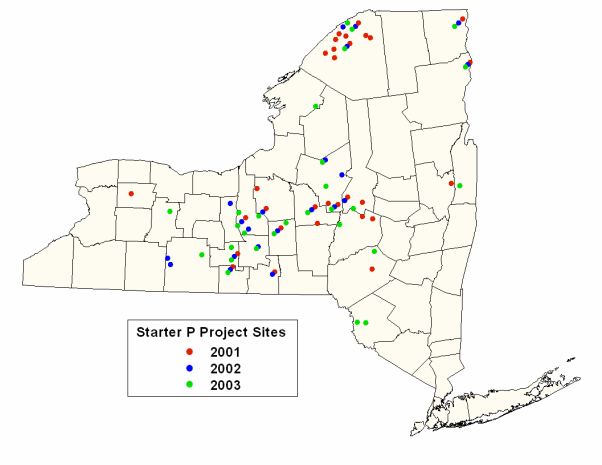

Figure 1: Starter P trial sites (2001-2003).

On-farm Demonstration Trials

Trials were established on farmer fields testing high or very high for P (>8 lbs P/acre Morgan).

From 2001 onwards, the majority of sites had four treatments:

- No starter.
- No P in the starter (N+K only).
- Low or recommended P in the starter (10 - 25 lbs P_2O_5).
- Producer's starter blend and rate.

Most treatments in 2002 and all treatments in 2003 were replicated at least two times. Most trials in 2000 and 2001 were unreplicated. Soil samples were taken for analysis from each plot at planting time and at PSNT time when corn reached 6-12 inches. Planting date, soil temperature at planting, field history (e.g., crop sequences and manure rates), and plant population were noted to aid in final data analysis and evaluation of results. Plots were harvested for corn silage or grain corn.

Field days were held at several locations (Figure 2). Audiences were asked to identify differences in corn growth with each of the four treatments and generally agreed that there were no visual P deficiency effects or growth differences.

Figure 2: Oneida Field Day.

Figure 3: Aurora Field Day.

Replicated Research Trials

Research station trials were carried out in four replicates in 2001, 2002, and 2003. Locations included Aurora, Morrisville Technical College (2002 and 2003), Willsboro Research Farm, Batavia Research Facility (2001 only), Stutzman's Research Farm (2002 only).

Four treatments were established at the research sites:

- No starter.
- No P in the starter (200 lbs of 10-0-10).
- 20 lbs of P_2O_5 (200 lbs of 10-10-10) in the starter.
- 40 lbs of P_2O_5 (200 lbs of 10-20-10) in the starter.

Also at the research station field days, participants were unable to identify the different treatments (Figure 3).

Results

Yields of the on-farm trials and on-station trials showed no significant response to P application on soils testing high or very high in P in 2001 and 2002. The 2003 results suggest a response to a small amount of starter P (<25 lbs P_2O_5/acre). No additional yield was obtained with higher amounts. Analysis of the combined 3-year average allowed us to check if responses 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 recently. 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 P_2O_5/acre) while for fields that were very high in P, yields responded to starter N (+K) only (Table 1). At the research station trials, there were no significant yield differences due to P applications at any of the locations in any of the years trials were conducted.

Table 1: Silage yields (tons/acre 35% dry matter) for on-farm trials conducted in 2001-2003.

Starter	2001	2002	2003	3-Year Average Soil Test P	
	27 trials	16 trials	22 trials	High	Very High
No starter	16.7 b	15.7 a	20.6 b	17.7 b	19.5 b
No P in starter	19.3 a	16.2 a	20.7 b	17.9 b	20.6 ab
10-25 lbs P_2O_5	19.9 a	16.5 a	21.7 a	19.2 a	21.4 a
>25 lbs P_2O_5	19.8 a	16.0 a	21.1 ab	18.2 ab	21.2 a

Conclusions

Based on the results of the past 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 P_2O_5/acre. The results confirm the P fertilizer guidelines shown in Figure 4. 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 (Table 2). 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.

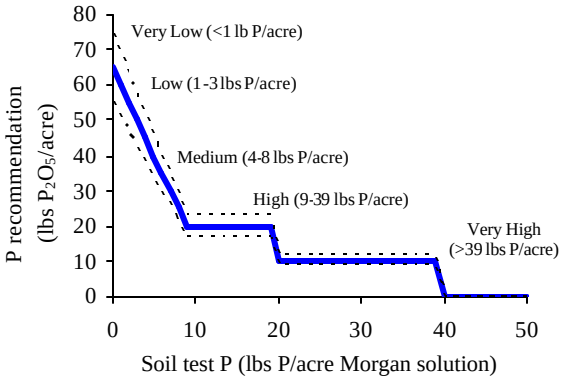

Figure 4: P recommendations for corn without the use of manure.

Table 2: Phosphorus guidelines for corn in New York.

P recommendation (lbs P_2O_5/acre)		
Soil Test P	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 P_2O_5/acre in the starter fertilizer band; balance may be included in the band or broadcast.		

For more information

For more information on the Starter P Project, contact Quirine Ketterings (qmk2@cornell.edu or 607 255-3061), Karl Czymmek (kjc12@cornell.edu or 607 255-4890), or your local Cooperative Extension Office. You can also write to: Quirine Ketterings, Nutrient Management Spear Program, Department of Crop and Soil Sciences, Cornell University, 817 Bradfield Hall, Ithaca NY 14853.