

What's Cropping Up?

A NEWSLETTER FOR NEW YORK FIELD CROPS & SOILS

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Soybeans usually follow corn in the rotation, a crop that frequently receives liberal amounts of N, P, and K. Consequently, New York farmers typically plant soybeans into fields that test medium-high to high in P. For these fields, Cornell University typically recommends the addition of not more than 15-25 lbs P_2O_5 and a similar amount of N. Because soybeans are generally planted in late May or June when soil temperatures average 60°F or above, the question rises whether a small amount of N and P starter fertilizer is needed or not and how seed inoculation affects the recommendations.

We initiated a study in 1999 examining the response of soybeans to Cell-Tech and Hi-Stick seed inoculum and starter fertilizer application (15 lbs N and 55 lbs of P_2O_5 applied as 14 gallons/acre of 10-34-0) on fields testing high in soil test P (Morgan extractable P of 25 to 40 lbs P/acre). Responses were tested in fields that were never planted to soybeans or had been planted at least 4 times to soybeans in the 1990s. This study was continued through 2000. The 1999 growing season was ex-

tremely dry while 2000 was a very wet year.

Neither inoculum nor starter fertilizer application significantly increased the 2-year average soybean yields for fields with a soybean history (Table 1). A year x treatment interaction existed, however, because in the wet growing season of 2000 soybeans did show a significant 2 to 4 bu/acre response to seed inoculation in the absence of starter fertilizer. A 2 bu/acre response to the Hi-Stick inoculum was found as well when starter fertilizer had been applied (compare the starter with the starter+Hi-Stick treatment in Table 2). Soybean yields did not increase with starter N and P application without inoculation under the dry field condi-

tions in 1999. Overall, yields were higher in 2000 but no response to fertilizer application was found in that year either, despite a month of cool and wet conditions after the May 17 planting date.

The 2-year average soybean yields (1999 and 2000 data) for fields without a soybean history showed a significant 3 bu/acre response to inoculum in the absence of starter fertilizer and a 4 bu/acre increase with the Cell-Tech inoculum in the presence of starter fertilizer (Table 2). Once again, soybeans did not respond to starter N and P fertilizer in the absence of an inoculum. A starter fertilizer response was absent in the inoculated soybeans as well.

We will continue this study for one more year. Results obtained thus far indicate that soybean growers will most likely benefit from the use of inoculum especially in fields that have no soybean history. Our results also suggest that starter fertilizer addition is not likely to increase yields for soils that test high in P.

Soybean Fertilization

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Table 1. Soybean yields under different inoculum and starter fertilizer combinations in fields *with soybean history* in 1999 and 2000. This study was conducted at the Aurora Research Farm.

Treatments	1999	2000	2-year Average
-----bu/acre-----			
Cell-Tech+ Starter [†]	30	46	38
Cell-Tech	30	46	38
Hi-Stick + Starter	32	45	39
Hi-Stick	31	44	38
Starter	31	43	37
Check	32	42	37
LSD 0.05	NS	2	NS

[†] Starter fertilizer was applied at a rate of 15 lbs N and 55 lbs P_2O_5 /acre. Soils tested high for phosphorus availability.

Table 2. Soybean yields under different inoculum and starter fertilizer combinations in fields *without soybean history* in 1999 and 2000. This study was conducted at the Aurora Research Farm.

Treatments	1999	2000	2-year Average
-----bu/acre-----			
Cell-Tech+ Starter [†]	25	52	39
Cell-Tech	25	49	37
Hi-Stick + Starter	23	50	37
Hi-Stick	22	51	37
Starter	24	45	35
Check	21	47	34
LSD 0.05	NS	7	3

[†] Starter fertilizer was applied at a rate of 15 lbs N and 55 lbs P_2O_5 /acre. Soils tested high for phosphorus availability.

Conversion Equation Part I: Do Modified Morgan and Mehlich III P Have a Morgan P Equivalent?

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Introduction

Cornell University publishes the "Cornell Guide" which includes recommendations for N, P, K, Ca, and Mg and micronutrients for a large number of field crops in New York. The recommendations are based on decades of field research showing that soil nutrients extracted by Morgan solution are correlated well with nutrient response for the vast array of soil types in NY.

Several private soil-testing laboratories that serve NY producers use the Mehlich-III and/or modified Morgan extraction solution. In the past, Cornell's fertilizer recommendation software did not allow for the use of extractants other than Morgan's solution because prior research conducted in NY demonstrated a poor relationship between Morgan and Mehlich-III extractable P (Klausner and Reid, 1996). However, comparisons within similar soil types (Pote et al., 1996), pH and textural class (McIntosh, 1969) or Al content (Magdoff et al., 1999) suggested it might be possible to derive better conversion equations (models) by including specific soil (chemical) characteristics in the equations. In 1999, Cornell University faculty and staff, agribusiness and state and federal agencies joined resources in a statewide study aimed at deriving such conversion equations for NY soils. In this article, we focus on P conversions. In a future issue of "What's Cropping Up?" we will address conversions for K, Ca, and Mg.

Field Sampling and Analyses

Personnel from Agway Inc., Agricultural Consulting Services Inc., ConsulAgr Inc., Cooks Consulting Services and the Miner Institute collected 235 soil samples (0-6 or 8 inches) in NY. These samples represented 27 soil types and eight major agricultural soil groups from across NY (Table 1).

The soil samples were analyzed at Cornell's Nutrient Analysis Laboratory, A&L Laboratories Inc., Brookside Laboratories Inc., and Spectrum Analytic Laboratories. A&L analyzed the samples for modified Morgan and Mehlich-III P. Brookside determined Mehlich-III P, K, Mg, Ca and Al while Spectrum generated pH and Mehlich-III P data. At Cornell, soils were analyzed for pH and Morgan extractable P, K, Ca, Mg, and Al.

In early 2000, Agricultural Consulting Services Inc. added the modified Morgan P extraction to its standard soil-sampling package. This generated a dataset of a 10,331 samples taken throughout NY with soil test P (STP) ranging from 1 to 559 ppm P (modified Morgan). This dataset, referred to as the ACS 2000/2001 dataset, was used to study the implications of using modified Morgan and/or Mehlich-III soil tests and a conversion equation on P fertilizer recommendations generated with Cornell nutrient management software.

Results¹

The original 235 soil sample dataset covered an extensive range of soil chemical characteristics: 17-593 ppm Mehlich-III extractable P, 1-97 ppm Morgan STP, 380-1576 ppm Mehlich-III Al, 473-6025 ppm Mehlich-III Ca and 4.5-7.7 pH. Comparisons between Morgan and modified Morgan P analyses provided a close relationship: Morgan P (ppm) = 0.90*modified Morgan P (ppm). Mehlich-III P results from Brookside and A&L were virtually identical. Spectrum consistently measured a slightly higher (6%) P level.

Regression analyses between modified Morgan or Morgan and Mehlich-III extractable P (averages of Brookside and A&L) showed results similar to those reported by Klausner and Reid (1996); a very poor correlation

$$\text{Morgan P (ppm)} = 1.617 + 0.5574 \cdot \text{M3P} - 0.001809 \cdot \text{M3Ca} - 12.97 \cdot \text{pH} + 0.05799 \cdot \text{M3Al} - 0.00002743 \cdot \text{M3Al}^2 + 1.2794 \cdot \text{pH}^2 + 0.00004445 \cdot \text{M3P} \cdot \text{M3Ca} - 0.0009237 \cdot \text{M3P} \cdot \text{M3Al} + 0.0000038 \cdot \text{M3P} \cdot \text{M3Al}^2$$

(Note: all data are in ppm) [Model 1]

In this equation all data are in ppm. Morgan STP is Morgan extractable soil test P, M3P is Mehlich-III extractable P, M3Al is Mehlich-III extractable Al, M3Ca is Mehlich-III extractable Ca, and pH is the soil pH in water (1:1). An r^2 value of 1 indicates a perfect correlation (and thus a very accurate prediction). For field data, an r^2 of 0.75 or higher is generally considered good.

Because most soil testing laboratories presently do not report Al in their standard packages, we developed a second equation without Al (all data in ppm):

$$\text{Morgan STP} = -55.53 + 1.366 \cdot \text{M3P} - 0.001284 \cdot \text{M3Ca} + 21.78 \cdot \text{pH} + 0.00005626 \cdot \text{M3P} \cdot \text{M3Ca} - 0.5244 \cdot \text{M3P} \cdot \text{pH} - 2.028 \cdot \text{pH}^2 + 0.0490 \cdot \text{M3P} \cdot \text{pH}^2$$

($r^2=0.82$) [Model 2]

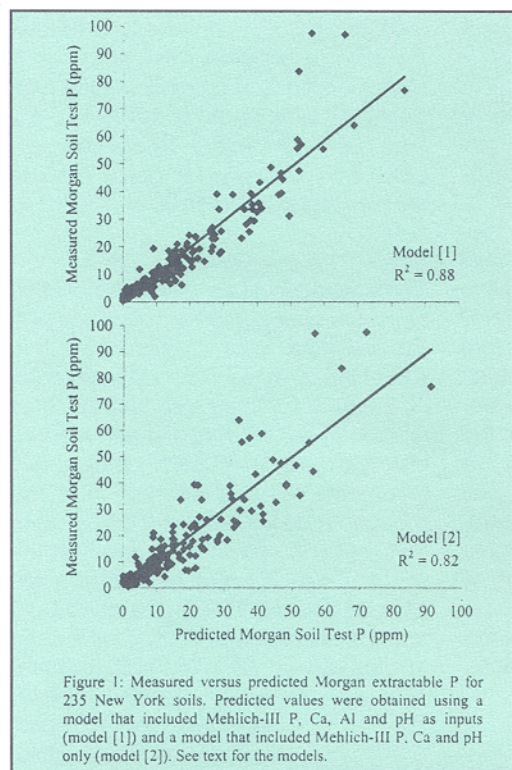
Figure 1 shows measured versus predicted values for both models. Model [1] predicted 86% within 5 ppm (10 lbs/acre) of the measured value. The predictions for model [2] (i.e. no Al included) were slightly less accurate: 79% of the samples were predicted with a maximum deviation of 5 ppm (Figure 2). Deviations between measured and predicted values did not correlate with measured STP (i.e. deviations occurred throughout the range of measured soil test values).

Implications for Recommendations

Although a deviation of 10 lbs P/acre (5 ppm) in soil test P may seem large, such a deviation will not necessarily result in different P fertilizer recommendations. The "Cornell Guide" recommends a P application of 20 (± 5) lbs P_2O_5 /acre for corn grown on soils testing high for available P (9-39 lbs P/acre Morgan soil test P). No P addition is recommended for optimal economic yield when the STP is very high (≥ 40 lbs P/acre or 20 ppm P) while for soils with Morgan P levels less than 9 lbs P/acre, the recommendation is (65-[5*STP]) $\pm 25\%$. In this calculation, STP is Morgan soil test P in lbs/acre. Recommendations are given as ranges because the relationship between soil test results and yield response is not perfect. The

Table 1: A total of 235 soils from 8 major agricultural areas in New York State were sampled to derive Morgan to Mehlich-III conversion equations. (#) = number of locations sampled per soil type. The soil type of four samples remained unidentified.

Northern Tier Till High lime	Southern Tier and Catskill Till - Acid	Valley and Lake Plain, lacustrine/marine	Outwash
A. Well drained	A. Well drained	A. Well drained	A. High pH
Honeoye (21)	Lordstown (6)	Collamer (7)	Arkport (6)
Ontario (21)	Mardin (21)	Hudson (3)	Howard (3)
Madrid (6)	Schroon (1)	Hamlin (3)	Braceville (1)
Hogansburg (6)	Bath (7)		
B. Poorly drained	B. Poorly drained	B. Poorly drained	B. Low pH
Lima (2)	Volusia (30)	Rhinebeck (18)	Chenango (29)
Appleton (7)	Fremont (7)	Munuscong (1)	Colonie (1)
Ovid (11)	Malone (2)	Niagara (7)	
Angola (3)		Madalin (1)	



goal is to ensure that the true value for P application falls within the $\pm 25\%$ range 90-95% of the time.

We used the ACS 2000/2001 dataset to see how often we derive P recommendations for corn (using pH, Mehlich-III P and Ca and model [2]) that are not within the acceptable range. This comparison showed that for almost 60% of the 10,331 samples, recommendations based on predicted Morgan and those based on measured Morgan soil test P were identical. An additional 30% of the predictions generated 5-10 lbs P_2O_5 /acre difference in recommendation and a total of 8% deviated 15-20 lbs P_2O_5 . Almost 95% of the time, recommendations derived using pH, Mehlich-III P and Ca data fell within the $\pm 25\%$ range. A slight improvement can be expected if Mehlich-III Al is included and model [1] is used for the conversion.

Conclusions

Cornell's fertilizer recommendations are based

on the Morgan extraction solution. Thus, the most accurate recommendations are obtained using the Morgan solution for soil testing. However, the results of this study have shown that recommendations can be derived with modified Morgan as well as with Mehlich-III P input data if the soil pH and Mehlich-III Ca are known. The predictions can be improved by using an equation that includes Mehlich-III Al.

Conversions from other extractants (e.g. P Bray, Olsen) to Morgan P values may or may not correlate as well as the Mehlich-III to Morgan conversions in this study. Separate studies are needed to address conversions for other extractants. Separate studies are also needed if laboratory procedures are changed.

The P conversion models will be programmed into Cropware (Cornell's nutrient management software) that will be released in May 2001 and used to determine the NY P index for fields that have Mehlich-III soil test data. In a future article in "What's Cropping Up?" we will discuss Morgan equivalents for Mehlich-III K, Ca, and Mg.

Acknowledgments

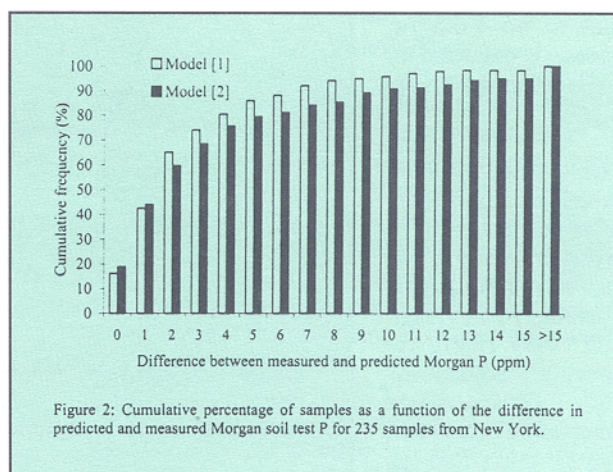
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¹ All equations assume soil test values in ppm. To convert lbs/acre to ppm, divide by 2. To convert ppm to lbs/acre, multiply by 2.



Phosphorus and Agriculture VII: Phosphorus Starter Demonstration Project. Results of the 2000 Growing Season

Karl Czymmek, PRO-DAIRY, Janice Degni, Area Extension Specialist CCTS, and Quirine Ketterings, Department of Crop and Soil Sciences

Participating CCE agents: *Shawn Bossard (Cayuga Co), Kevin Ganoe (Mohawk Region Area Extension Specialist), Janice Degni (CCTS Area Extension Specialist), Dale Dewing (Delaware Co), Pete Barney (St. Lawrence Co), Dayton Maxwell (Saratoga Co), Aaron Gabriel (Washington Co), Mike Dennis (Oneida Co, formerly Sullivan Co) and Mike Hunter (Lewis Co). New participants for 2001: Nate Herendeen (NWN Area Extension Specialist), Kathy Evans (Madison Co), Beth Spaugh (Clinton Co).*

Participating producers: *Steve Nemec (Moravia), Jerry Blumer (Weedsport), Joe and Kirk Schwasnick (Little Falls), Steve and Gary Natali (East Springfield), Maurice Stoughton (Newark Valley), David Post (Stamford), Gary Gaige (Mecklenburg), Mark Jahnke (Cooperstown).*

Other participants: *Ev Thomas (Miner Institute), Mark Ochs (consultant), Elaine Dalrymple (Schuyler Co SWCD).*

Agronomic P Recommendations

Agronomic soil tests are relative indices of plant available nutrients. Yield benefits from an applied nutrient are greatest for soils with a low agronomic soil test for that particular nutrient. Minimal to no yield response is expected for soils testing high to very high.

The Cornell Nutrient Analyses Laboratory rates soil test P (STP) levels of 9-39 and ≥ 40 lbs P/acre (Morgan extractable P) as "High" and "Very High", respectively. Soil test levels < 1 lbs P/acre are considered "Very low", 1-3 is classified as "Low", and 4-8 lbs P/

acre constitutes "Medium". Once a high STP reading is reached, minimal P fertilizer is required to support optimum yields. For most field crops, Cornell recommends limited fertilizer additions to fields with STP levels of 40 or higher for two reasons: 1) P addition to these soils is not likely to result in yield gains (and hence an economically bad investment); and 2) over-application may lead to P losses to surface and ground waters and thus contribute to environmental degradation. P recommendations for soils with STP's < 40 are presented in Figure 1. The solid line is the "average" recommended fertilizer P application. The dashed lines imply that recommendations are ranges rather than absolute values. Thus optimum economic recommendations fall with the dashed lines for each soil test P level. For P requirements < 25 lbs P_2O_5 /acre, the recommendation is to meet the requirement by banding starter fertilizer. For higher application rates and where manure is available, Cornell University recommends applying 25 lbs P_2O_5 /acre in the fertilizer band and supplying the rest with manure.

Starter P Project in 2000

It is not uncommon for NY farms to apply more starter P to corn fields than recommended by Cornell University. To evaluate and demonstrate the value of P starter application on soils testing high for soil P, we initiated a state-wide, on-farm starter P project. Specifically targeted were soils with Morgan P levels in the high range between 20 and 30 lbs P/acre.

Demonstration plots were established at twelve cooperator farms across NY. Harvest data were obtained from ten. Out of the ten sites, six met the criterion of 20-30 lbs P/acre soil test P. Sites differed in soil type, hybrid and manure history (Table 1). At each location, two treatments were established: 1) N and K but no P addition in the fertilizer band ("without P"); and 2) N, P and K in the starter ("with P"). For eight of the ten sites, pre-mixed 10-10-10 and 10-0-10 fertilizers supplied by Agway were used at rates varying from 100 to 250 lbs/acre. At two sites, locally obtained fertilizer was used. No additional inorganic P was applied beyond the starter at any of the sites. At several locations, additional N was added preplant or as a side-dress. Of the ten sites, four were harvested for grain corn and six for corn silage. Some fields had a manure history and/or received manure as recent as spring 2000 or fall 1999. Most plots were planted to corn between May 1 and 15. Silage samples from five sites were analyzed for total P.

Because at many of the sites treatments could not be replicated, statistical analyses were restricted to a mean comparison (comparison of the average yields with and without P in the fertilizer band).

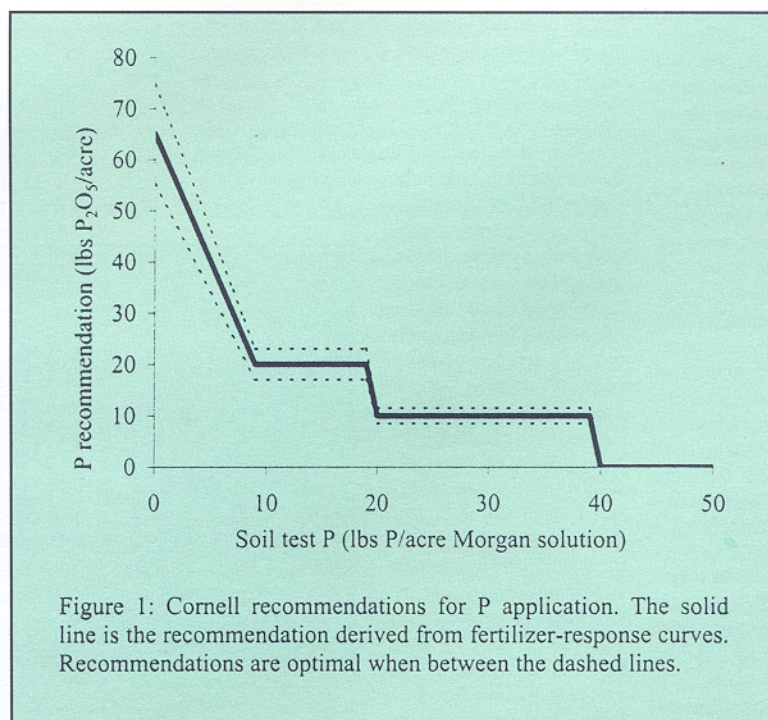


Table 1: Characteristics of the sites at which the starter demonstration trials were established in 2000.

Producer	Cooperator	Location	Soil Type	Soil Test P*	Corn Hybrid	Manure History
Gary Gaige	Mark Ochs, Janice Degni, Elaine Dalrymple	Mecklenburg, Schuyler Co	Conesus, Silt Loam	40	Not known.	Manure applied in the past.
Steve Nemec	Shawn Bossard	New Hope, Cayuga Co	Conesus, Silt Loam	21	38K06	No manure applied.
Jerry Blumer	Shawn Bossard	Weedsport, Cayuga Co	Ontario, Loam	118	BS440	Manure history but no application in the 2000 growing season.
Miner Institute	Ev Thomas	Chazy, Essex Co	Mohawk, Silt Loam	28	Novartis NK 446	80-50-100 applied as slurry in the fall of 1999.
Maurice Stoughton	Janice Degni	Newark Valley, Tioga Co	Howard, Gravel	14	38PO5	No manure applied.
David Post	Dale Dewing	Stamford, Delaware Co	Lewbeach, Silt Loam	19	NK4187	Some manure applied. Amount not available.
Steve and Gary Natali	Kevin Ganoe	East Springfield, Otsego Co	Wassaic, Silt Loam	22	Not known.	Not known.
Joe and Kirk Schwasnick	Kevin Ganoe	Little Falls, Herkimer Co	Mohawk, Silt Loam	21	Not known.	Not known.
Mark Jahnke	Kevin Ganoe	Cherry Valley, Otsego Co	Chenango, Gr. Silt Loam	24	Not known.	Some manure applied in 2000.
Mark Jahnke	Kevin Ganoe	Cooperstown, Otsego Co	Chenango, Gr. Silt Loam	24	Not known.	No manure applied in 2000.

* = soil test P in lbs P/acre Morgan solution.

Thus, we can observe individual differences at a specific location but not draw conclusions with regards to the cause of these differences.

Results and Discussion

Yields for each of the ten sites are listed per fertilizer treatment in Table 2. The average yield in the "without P" starter treatment (assuming 100 bushels of grain equal 17 tons of silage) was 19 tons/acre. The same average was found for the plots that did receive starter P.

Although we cannot draw conclusions for individual sites, several observations

are noteworthy. The site at New Hope in Cayuga Co exhibited a 10 bu/acre yield response to starter P. This difference in yield was large enough to cover P fertilizer costs and leave the producer with a marginal additional profit. This is the only site where an economic yield increase was obtained. Seeding depth may have had an impact on the need for starter P as the planting depth was about 3 inches. It is interesting to see that a neighboring plot that received an application of 36 lbs P_2O_5 /acre yielded only 2 bu/acre more than the corn that had received a 10 lbs P_2O_5 /acre application. Thus, it seems that 10 lbs of P_2O_5 in the starter may have been enough to achieve maximum eco-

nomical yield, even when the corn was planted excessively deep.

On the contrary, yields at the Stamford site in Delaware Co were almost 3 tons lower when P was added to the starter. This yield boost in the "without P" plot was surprising at first. However, plant populations differed greatly between the plots: 25,200 plants/acre (with P) versus 28,700 plants/acre (without P) possibly as a result of differences in planter seed units.

The site in Newark Valley (Tioga Co) also presented an interesting situation. No yield increase in response to P was recorded despite the fact that the STP was

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only 14 lbs P/acre and the field had not received manure in >20 years!

Silage samples from five sites were tested for nutrients. Average P concentrations in these silage samples (on a dry matter basis) were 0.24% P ("without P") and 0.25% P ("with P"). The "without P" plots removed 49-74 lbs P_2O_5 (an average of 3.9 lbs P_2O_5 /ton of corn silage) while the "with P" plots removed 49-82 lbs P_2O_5 (average of 4 lbs P_2O_5 /ton).

Conclusions

There was variation in the yield data among the sites most likely as a result of differences in cultural practices, growing conditions, and manure histories. Averaged among all fields, no yield increase was obtained by adding starter P to soils with initial STP's of 20 lbs P/acre or higher. These results support the current recommendation of a banded P starter of not more than 10 lbs P_2O_5 /acre for soils with a STP of 20 to 39 lbs P/acre (Morgan solution).

Starter P Project in 2001

The starter P project will be continued

Table 2: Fertilizer treatments and yields (grain yields at 15% moisture, silage yields at 65% moisture) of the P starter demonstration trials in 2000.

Producer	Planting Date	No P	With P
Gary Gaige et al.	May 10 2000	188 lbs 21-0-0 18 tons	188 lbs 15-13-10 19 tons
Steve Nemec and Shawn Bossard	May 8 2000	100 lbs 10-0-10 124 bu	100 lbs 10-10-10 134 bu
Jerry Blumer and Shawn Bossard	May 31 2000	250 lbs 10-0-10 15 tons	250 lbs 10-10-10 14 tons
Ev Thomas, Miner Institute	May 17 2000	250 lbs 10-0-10 18 tons	250 lbs 10-10-10 18 tons
Maurince Stoughton and Janice Degni	May 3 2000	200 lbs 10-0-10 167 bu	200 lbs 10-10-10 166 bu
David Post and Dale Dewing	May 4 2000	225 lbs 21-0-0 16 tons	200 lbs 20-10-10 13 tons
Steve and Gary Natali and Kevin Ganoe		250 lbs 10-0-10 12 tons	250 lbs 10-10-10 12 tons
Joe and Kirk Schwasnick and Kevin Ganoe		250 lbs 10-0-10 18 tons	250 lbs 10-10-10 20 tons
Mark Jahnke and Kevin Ganoe	May 1 2000	250 lbs 10-0-10 167 bu	250 lbs 10-10-10 171 bu
Mark Jahnke and Kevin Ganoe	May 11 2000	250 lbs 10-0-10 85 bu	250 lbs 10-10-10 83 bu

this summer. Demonstration efforts will focus on monitoring recommendations for STP levels between 9-19 and ≥ 40 lbs P/acre, and identifying past management and environmental factors that may affect when and how much starter P is needed. The treatments for these demonstration trials will be standardized and extended to include: 1) no starter; 2) 200 lbs of 10-0-10; 3) 200 lbs of 10-10-10; and 4) the producer's usual starter blend and application rate.

In 2000 several producer field days were held to view the plots and discuss oppor-

tunities for P management. Those field days will be continued in 2001. Added will be a survey among participants in the project and producers that visit the field days to assess impact of the project.

Demonstration plots will be supplemented this year with replicated trials on experimental stations at Batavia's New York Crop Research Facility, Cornell University's Willsboro Farm and the Musgrave Research Farm in Aurora. These replicated trials will focus on STP levels between 9 and 19 lbs P/acre and involve three treatments: 200 lbs per acre of 10-0-10, 10-10-10, or 10-20-10 in four replicates. Field days are planned at all three locations.

Acknowledgments

This project was funded in 2000 and will continue to be funded in 2001 by grants from NRCS. The starter fertilizers were donated by Agway's Lyons blend plant. We owe many thanks to all the cooperators that assisted with this project, especially Garret Waldron of Agway's Lyons blend plant.

Alfalfa Winter Kill: Are you sure it is not caused by Alfalfa Snout Beetle?

Elson Shields, Department of Entomology, Cornell University

**Pest
Management**

Areas of winter-kill in alfalfa fields become very evident during the early spring when alfalfa initiates growth. Later in the growing season, these bare spots are filled in with the growth of weeds or are hidden by the taller alfalfa growth. This loss of alfalfa stand can often be attributed to winter conditions but also could be caused by an undetected alfalfa snout beetle infestation. While the known alfalfa snout beetle infested area is limited to 9 counties (Cayuga, Clinton, Essex, Franklin, Jefferson, Lewis, Oswego, St. Lawrence, Wayne), each newly discovered infestation has been thriving for a number of years masquerading as winter-kill before being identified as alfalfa snout beetle. The most recently discovered infestation was in Franklin Co. near Malone, and the evidence suggests that snout beetle has been in the immediate area for a number of years. Currently, approximately 13% of New York agricultural area is within an alfalfa snout beetle infested area and we believe that the actual snout beetle infested area is actually larger than now known. Unless the killed plants are actually dug and the roots examined for the signs of root feeding, snout beetle damage and related alfalfa stand loss mimics winter kill from cold temperatures closely.

To eliminate the possibility of the winter-kill being caused by alfalfa snout beetle, dead plants within the area and surviving plants on the perimeter of the area need to be dug and the roots examined for the feeding damage by alfalfa snout beetle larvae. Feeding injury on smaller plants is limited to severing of the tap root 1-4 inches below the soil surface with the severed

end concave in shape as the larvae feeds up into the core of the root. Feeding injury on larger plants includes root severing, deep feeding wounds into the center of the tap root and long spiral grooves chewed longitudinally on the root surface. The grooves are often 1/4 inch wide and 1/16-1/8 inch deep. On surviving plants, these feeding wounds will persist for a couple of years and are very characteristic of alfalfa snout beetle injury. Since the majority of plant death from alfalfa snout beetle feeding occurs in late summer-early winter, dead plants often decompose leaving bare spots in the field the following spring. In contrast, plants killed by unfavorable winter conditions are usually killed in late-winter and frequently still remain when the dead areas are noticed the following spring.

Areas of New York at Highest Risk

Alfalfa snout beetle is spread with the movement of drainage equipment, earth moving equipment, soil, gravel, farm equipment and on two occasions, bee hives. Farms within an infested county are at the highest risk to becoming infested with alfalfa snout beetle. Due to the movement of drainage equipment between agricultural fields, farmers having drain tile installed within an infested county or in an adjacent county are at high risk. The three most recently discovered snout beetle infestations strongly suggest a close link to the movement of tile drainage equipment onto the farm. To protect yourself from alfalfa snout beetle, require the drainage contractor to completely clean his equipment at the previous job

site before bringing the equipment onto your farm.

Once an area is infested with alfalfa snout beetle, it remains permanently infested due to the wide array of natural hosts growing wild within the Northeastern US. Plant hosts not only include alfalfa and clover but also include Queen Anne's lace (wild carrot). In Europe, this insect is a major pest on grapes so survival on the patches of wild grapes found throughout New York is expected. Once established on a farm, entire alfalfa stands are frequently killed out in a single year and alfalfa production becomes extremely expensive and unprofitable. Many growers are forced to grow grass on fields which previously were prime alfalfa fields. Alfalfa snout beetle causes the most severe level of damage on the best drained fields on the farm. Without alfalfa providing an inexpensive source of protein for the dairy operation, profitable dairy farming becomes increasingly difficult. Once alfalfa snout beetle becomes established on the farm to the point that alfalfa production is difficult, the cost of making milk increases nearly 25% due to the increased costs of forage production. After snout beetle has become established on a farm, management can only be accomplished using 3 year alfalfa rotations with a non host crop such as corn or soybeans. The use of insecticides to control the insect population is totally ineffective and therefore is not recommended.

If you suspect that your winter-kill is a result of alfalfa snout beetle, please contact your local extension agent or agribusiness professional.

Calendar of Events

June 7	Small Grain Management Field Day, Musgrave Research Farm, Aurora, NY
June 24-27	Northeastern Branch ASA-SSSA Annual Meeting, University of Rhode Island, Kingston, RI
July 6	Weed Science Field Day, Valatie Research Farm, Valatie, NY
July 13	Aurora Field Day, Musgrave Research Farm, Aurora, NY
July 17	Weed Science Field Day, Musgrave Research Farm, Aurora, NY
July 18	Weed Science Field Day, Thompson Research Farm, Freeville, NY
Oct. 21-25	ASA-CSSA-SSSA Annual Meetings, Charlotte, NC
Oct. 30	Field Crop Dealer Meeting, Chaucers Restaurant, Clifton Park, NY
Oct. 31	Field Crop Dealer Meeting, Ramada Inn, New Hartford, NY
Nov. 1	Field Crop Dealer Meeting, Batavia Party House, Batavia, NY
Nov. 2	Field Crop Dealer Meeting, Holiday Inn, Auburn, NY

What's Cropping Up? is a bimonthly newsletter distributed by the Crop and Soil Sciences Department at Cornell University. The purpose of the newsletter is to provide timely information on field crop production and environmental issues as it relates to New York agriculture. Articles are regularly contributed by the following Departments at Cornell University: Crop and Soil Sciences, Plant Breeding, Plant Pathology, and Entomology. **To get on the mailing list, send your name and address to Pam Kline, 144 Emerson Hall, Cornell University, Ithaca, NY 14853.**



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