What's Cropping Up?

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Nitrogen Savings for First Year Corn

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Nitrogen is essential for the proper growth and development of all field crops including corn. Without sufficient N, both corn yields and silage quality can be impacted. Too much N can be a waste of money and leads to environmental losses. Producers and consultants asked if additional N was needed for corn following legume and/or grass sods in the rotation (first year corn) and if the answer to this question depended on sod composition and/or timing of sod turnover. With funding from the Northern New York Agricultural Development Program (NNYADP) and the New York Farm Viability Institute (NYFVI), we set out to answer this question.

First Year Corn Project

Data were collected from a total of 16 sites (3 research station trials and 13 on-farm trials). The trial locations were chosen based on the following criteria:

- Corn grown for silage in the 1st year following alfalfa, alfalfa/grass or grass sod;
- Field received no manure following the last harvest of the previous crop;
- Received no more than 30 lbs N/acre in the starter fertilizer.

Four sites were turned over in the fall while 12 were spring-killed; sod compositions varied from pure grass stands to legume/grass mixtures with up to 70% legume in the stand.

Producers were asked to plant the corn as they would normally do (no more than 30 lbs starter N) and when corn was 6 to 12 inches tall, 16 plots (4 treatments, 4 replications) were outlined in each field. Sidedress treatments of 0, 50, 100 and 150 lbs N/acre were used at the on-farm trials. In the 3 research station trials a no starter/no sidedress treatment was included as well. So, the on-farm trials allowed us to determine if the corn responded to the sidedress N beyond starter N application while the research station trials could be used to answer the question if starter N was needed in the first place.

Soil samples (8 and 12 inch depths) were taken at sidedress time and again at harvest. A standard soil fertility analysis was performed on the 8 inch samples while the 12 inch samples were analyzed for nitrates only (PSNT and end-of-season soil nitrate test).

Corn was harvested for silage at a target dry matter (DM) of 35%. Forage samples were analyzed for crude protein (CP), soluble protein (SP), neutral detergent fiber (NDF), digestible neutral detergent fiber (dNDF), lignin and starch. "Milk 2006" was used to estimate the effects of starter and sidedress N on milk production potential.

What Did We Find?

Yield

The research station trials showed that although sods can supply a large amount of N, first year corn will still benefit from a small application (30 lbs N/acre) of banded starter N fertilizer (Table 1). These results were similar to what we had seen with on-farm starter phosphorus trials in 2001-2003. Yet, additional fertilizer beyond the small starter application did not increase the yields of 1st year corn regardless of tillage, the timing of sod kill, or the amount of grass or legume in the sod (Table 2).

Research Station Trials

Table 1: Addition of a small N starter (30 lbs N/acre) was sufficient for optimum corn silage yield.

Starter N	Side-dress N	Corn silage yield (35% DM)*		Moisture Content*	
lbs/acre		tons/acre		%	
0	0	19.6	b	58.8	a
30	0	21.1	ab	58.6	a
30	50	21.5	a	58.2	a
30	100	22.6	a	58.8	a
30	150	22.1	a	58.6	a

*Average values with different letters (a,b,c) are statistically different ($\alpha = 0.05$). Results are based on 3 New York trials conducted in 2005 and 2006.

On Farm + Research Station Trials

Table 2: Additional N (beyond starter N) was not needed for 1st year corn silage production.

Side-dress N	Corn silage yield* (35% DM)		Moisture Content*	
lbs/acre	tons/acre		%	
0	21.7	a	62.1	a
50	22.2	a	61.9	a
100	22.4	a	62.3	a
150	22.4	a	62.1	a

*There were no significant (α=0.05) differences as indicated by identical letters (a) for each treatment. Results are based on 16 New York trials conducted in 2005, 2006.

Forage Quality

A starter N application was sufficient to deliver optimum forage quality (Table 3); NDF, dNDF, lignin and starch content

Nutrient Management

of corn silage were not affected by leaving out sidedress N. Applying sidedress N and increasing the N rate did cause a slight increase in the CP and SP content of the silage but this did not impact the overall expected milk production per ton of silage(milk per ton of silage).

Soil Testing for N

Currently the PSNT is the most commonly used test for assessing whether corn fields need N fertilizer beyond a small starter N application. However, this test is considerably less accurate on first year corn fields than on fields that are in their second year or beyond. This was evident in results of the 1st year corn trials (Table 4).

Current NYS guidelines suggest that you sidedress if the PSNT value is below 21 ppm while a PSNT of 25 or higher suggests that no additional N is needed. If the PSNT is 21 to 24, there is a 10% chance of a yield response and one could consider sidedressing 25-50 lbs N/acre if you do expect a response. In this data set 6 sites were below 21 ppm, while an additional 3 sites had PSNT values between 21 and 24 ppm. This could have resulted in unnecessary N applications for 6-9 of the sites. Other work by colleagues in Connecticut indicates that a critical PSNT value of 14 ppm should be used for first year corn. Using this cutoff, 6 of the 16 sites would still have called for sidedress N without resulting in a yield response. Since the PSNT has not performed well on first year corn and first year corn does not show a yield or forage quality benefit to sidedressing of N, taking a PSNT on first year corn sites is not recommended; it is a waste of time and money.

Table 3: Additional N beyond a small starter N application increased crude and soluble protein (CP and SP) of 1st year corn but did not impact other quality parameters and overall silage quality*.

N sidedress rate	Milk per ton	Crude protein	Soluble protein	NDF	NDF 48	Lignin	Starch
lbs N/acre	lbs/ton	% of dry matter (DM)					
0	3193 a	7.1 c	1.3 b	45.4 a	62.6 a	3.2 a	30.8 a
50	3234 a	7.5 b	1.4 a	44.4 a	63.1 a	3.2 a	31.3 a
100	3214 a	7.7 a	1.4 a	44.5 a	62.5 a	3.2 a	30.9 a
150	3211 a	7.8 a	1.4 a	44.6 a	62.6 a	3.2 a	30.8 a

*Average values with different letters (a,b,c) are statistically different (α = 0.05). Other quality parameters such as milk per ton silage were not impacted by N treatment. Results are based on 16 New York trials conducted in 2005 and 2006.

Table 4: Pre-sidedress nitrate test (PSNT) values for the 16 first year corn sites. None of these sites were responsive to sidedress N application.

Site ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PSNT (ppm)	41	21	12	25	25	21	30	27	23	14	44	4	32	11	6	6

What Do We Conclude?

Independent of field history adding N beyond a small starter application to 1st year corn will not result in a yield or silage quality increase and can lead to substantial environmental losses. A simple starter N application of no more than 30 lbs N/acre is sufficient for these fields.

Acknowledgments and For Further Information

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Nutrient Management Spear Program
http://nmsp.css.cornell.edu/

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

Grass Bioenergy - Where is it headed?

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Rural America has a tremendous capacity for energy production. While the ongoing energy crisis is the primary driving force for alternative energy development, environmental issues will sooner or later overshadow energy supply issues. An ideal alternative solid biomass feedstock should be nearly carbon neutral, without significant net increase in atmospheric carbon dioxide. Due to the high energy conversion ratio of grass combustion, grass provides a minimum of 8 times the greenhouse gas reduction benefit of corn ethanol. A recent article (Tilman et al., 2006, Science 314:1598-1600) claims that low-input native grasses as biofuel can actually result in a net removal of carbon from the atmosphere.

Keener et al. (www.oardc.ohio-state.edu/ocamm/keener_**corn_combustion**.pdf) state that if corn was burned, replacing liquid fossil fuels for heating, it would provide 2-4 times more useable energy for transportation, compared to turning that same corn into ethanol. Since burning grass is about twice as energy efficient as burning corn, then replacing liquid fossil fuels for heating with grass should result in 4-8 times more useable energy available for transportation then converting the same amount of corn into ethanol. So, whether you are concerned about the transportation fuel shortage or concerned about greenhouse gases, grass biofuel for combustion should eventually surface as one of the alternative solid biomass winners. First, state and federal governments must be convinced to invest something into combustion appliance and system infrastructure development.

Grass Selection

While there are a few exotic grasses, such as Miscanthus, that deserve some attention, the most promising grass species in the Northeast are switchgrass and reed canarygrass. Both species have similar yield potentials in the Northeast using current varieties. We are currently evaluating wild-type reed canarygrass, a similar project in Sweden increased reed canarygrass yield by 20%, just by selecting the top entry. There is potential for significant genetic improvement of grasses for biomass, using the latest genomics tools. Reed canarygrass is often criticized for its aggressive nature, such that it is one of the few native species unofficially labeled as invasive.

Recently, the Invasive Species Advisory Committee produced a white paper to clarify the definition and characteristics of invasive species (http://www.invasivespeciesinfo.gov/docs/council/isacdef.pdf). In their summary they state:

> "Furthermore for policy purposes, to be considered invasive, the negative impacts caused by a non-native species will be deemed to outweigh the beneficial effects it provides."

"Invasive" labeling is a value judgment. Biomass production across the USA will undoubtedly expand significantly in the near future, and a high yielding, successful biomass species will possess significant societal benefit. Selection for high biomass productivity in reed canarygrass is unlikely to increase its aggressive behavior in the wild. Following biomass selection and evaluation, a comparison of beneficial societal effects vs. negative impacts can then allow an informed value judgment on the species.

Grass Combustion Options

1. Burn undensified grass. Grass has been burned for centuries to generate heat, many settlers on the Great Plains in the late 19th century stayed alive with grass heat. Although all of those old fireplaces and stoves were relatively dangerous to operate, there are new appliances capable of handling loose chopped hay or straw.

   a. Large boilers in parts of Europe burn straw and grass after the feedstock is first ground to a fine powder and then injected into the boiler.

   b. Light industrial sized boilers are available that may be able to burn undensified grass. HeatWerks Inc. from Kansas has installed a boiler in northern NY that accepts loose, coarsely chopped hay and heats hot water to service multiple buildings.

   c. A larger scale light industrial boiler manufactured in Pennsylvania will be tested this winter in PA using chopped switchgrass as a feedstock.

Advantages to undensified grass: Minimum cost for biofuel preparation. Makes it possible to have a completely closed energy loop on-farm.
Disadvantages to undensified grass: Requires relatively large scale. Potential for a less complete burn and increased emissions, compared to pellets. More equipment needed with more maintenance.

2. Burn densified grass. Although grass could be cubed or made into large briquettes, as is sometimes done in Europe, pelleting is the primary method of densification of biomass in North America.

   a. Pellet stoves. It has been several years since we demonstrated that it was possible to burn pelleted grass in some corn stoves. To-date there has still been no serious attempt by pellet stove manufacturers to design a stove better adapted to high ash fuels such as grass. Options which should be considered in developing a grass pellet stove are 1) some attempt at controlling burn temperature to minimize ash melting, 2) Use of ceramics or similar materials for sections of the stove most susceptible to corrosion, 3) some method for active management of the ash produced, and 4) automatic removal of ash from the stove. Currently, the Harman PC45 corn stove remains the best option for burning a range of biomass pellets, including grass. Any pellet stove with passive movement of ash into an ash container will most likely not be able to handle grass pellets.

   b. Light industrial boilers. A 500,000 BTU stoker unit from Solagen, Inc. is capable of burning grass pellets. The unit has been tested with sugarcane bagasse that was nearly 7% ash.

Mixtures as a Temporary Solution

Anyone who has attempted to burn corn grain in a pellet stove has quickly discovered that this is an imperfect process. Buildup of burned material requires regular maintenance. Many have discovered materials that improve the burn process when mixed with corn. Mixing corn grain with grass pellets is an excellent way to improve the burn process, with a range in acceptable mixtures from 80:20 to 20:80. A number of individuals are currently attempting to mix a variety of feedstocks into a single pellet. Pelleting of mixed feedstocks may facilitate marketing and be somewhat more convenient for consumers, but it has not yet been shown that a pellet composed of several feedstocks burns any better than simply mixing the feedstocks prior to burning.

A Harman corn stove has been installed in the Big Red Barn on the Cornell campus. This stove is successfully burning a mixture of grass pellets and corn grain. [picture].

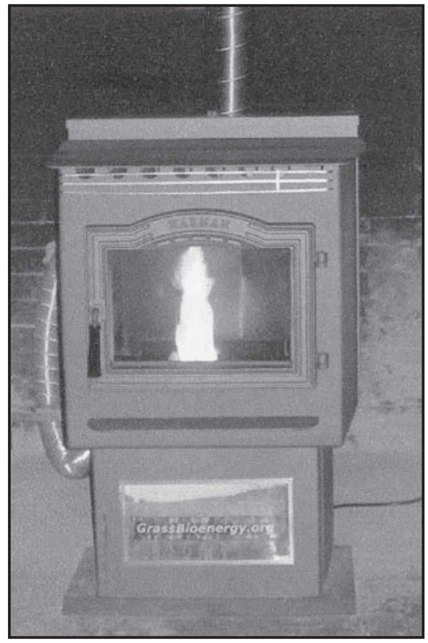
Status of Pelleting

Regular requests are received for information on how to pellet feedstocks in a garage or backyard. Many individuals would like to produce their own fuel, but the pelleting process favors relatively large scale equipment.

Considerable pressure and heat are required, along with the ability to adjust dye specifications, in order to produce a high quality pellet. A standard pelleting facility for grass requires a tub grinder or the equivalent for coarse grinding. Then feedstock is fed into a hammer mill to produce the finely ground raw material necessary for pelleting. The finely-ground material is typically elevated into a cyclone for storage prior to feeding into the mill. A feeding screw into the pellet mill is required to control product flow. The pellet mill itself must be fitted with a dye that optimizes pellet formation with grasses. Fresh pellets need to be screened to remove fines and cooled to prevent moisture uptake. After cooling, pellets can either be stored in bulk or bagged, both a bagger and a bulk storage system may be necessary. Even if used equipment is purchased, this system will likely cost several hundred thousand dollars, including building costs. Pelleting systems are likely to be economically marginal with a relatively low return per ton of pellets, encouraging larger scale, full-time operations.

At least one smaller system exists that may work for pelleting grass. The Swedish Kompakt Pellet Press is a complete pelleting unit mounted on a roughly 6 x 8' skid. This unit accepts a coarsely ground feedstock and can be purchased with a separate bagging system. The capacity of this unit is approximately 2 to 3 tons of pellets in an 8 hour day. The cost of this unit is now approaching $100,000, due to the recent decline of the dollar relative to the Swedish monetary unit.

At least one company in the USA is attempting to develop a PTO-driven pelleting system. Such units were apparently available in the past, it is not clear if any are currently available.



Summary

Grass combustion is not a new idea. Some effort needs to be invested in modifying appliances for grass. Some government support would be helpful for start up of an industry that requires production and a simultaneous market. The many positive benefits of grass for bioenergy should eventually overcome the lack of an organized political lobby.

Hedge Bindweed Control One Year After Postemergence Herbicide Applications in Field Corn

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Weed Management

Hedge bindweed, a perennial member of the morning-glory family, reproduces by seed and spreads by fleshy, creeping rhizomes (underground stems). Although these rhizomes can be extensive, they are rather shallow (down to 12 inches) compared with those of field bindweed. Hedge bindweed is easier to control than field bindweed.

Experiments established

Since postemergence (POST), translocated herbicides work best on creeping perennials when applied at the bloom stage and beyond, the situation for these experiments was manipulated to have bindweed near this stage before corn was too tall for good spray coverage. Adjoining blocks of a bindweed infested field near Aurora, NY were fall plowed and fitted in 2003 and 2004. Corn planting, with a zone-tillage planting, was then delayed until late May of 2004 and 2005. Preemergence herbicides were applied to control/suppress yellow nutsedge and annual weeds. POST bindweed treatments were applied when bindweed had 20- to 24-inch vines and corn was at the V3 to V4 stage of development (about 8 inches tall). POST applications were made in 20 gallons per acre of water and included 0.25% (v/v) of nonionic surfactant and 2.5% (v/v) of 28% urea ammonium nitrate.

Control 1 year after treatment

Control ratings made 1 year after treatment (YAT) are shown in Table 1 and followed the same trend as ratings made 4 weeks after treatment. Control 1 YAT ranged from 17% with 0.76 oz/A of Beacon to 91% with 16 oz/A of Clarity, while 8 oz/A of Clarity controlled 88% of the bindweed. Distinct, a mixture of dicamba (the active ingredient in Banvel and Clarity) and diflufenzopyr provided 89 and 92% bindweed control when applied at 4 and 6 oz/A respectively. **Distinct registration is pending in NY State**. Control with 22 oz/A of Roundup WeatherMax improved from 61 to 87% when tank-mixed with 4 oz/A of Clarity. The sulfonylurea herbicides, Beacon, Exceed, Permit, and Steadfast, also benefited from the addition of 4 oz/A of Clarity. Control with Beacon or Permit increased from 17 to 87% and from 31 to 89% respectively when tank-mixed with Clarity. Bindweed control with Exceed or Steadfast increased from about 76 to 87% when tank-mixed with Clarity. Finally, 5 oz/A of NorthStar or 8 oz/A of Yukon controlled 83 and 89% of the bindweed 1 YAT respectively.

Yields 1 year after treatment

Grain corn yields from the untreated checks of the two experiments 1 YAT averaged 15 Bu/A (Table 1). Yields with 8 or 16 oz/A of Clarity were 144 and 145 Bu/A respectively while those with 4 or 6 oz/A of Distinct averaged 143 and 150 Bu/A. Average yield with 22 oz/A of Roundup WeatherMax increased from 111 to 135 Bu/A when tank-mixed with 4 oz/A of Clarity. Likewise, yields increased from 32 to 143 Bu/A and from 54 to 145 Bu/A when 4 oz/A of Clarity was tank-mixed with 0.76 oz/A of Beacon or with l oz/A of Permit respectively. Although the addition of 4 oz/A of Clarity improved bindweed control with Exceed or Steadfast, this did not result in improved yields 1 YAT. These four treatments had an average yield of 133 Bu/A. Finally, the NorthStar and Yukon premixes produced yields that were similar to the yields from their respective tank mixes (Beacon plus Clarity or Permit plus Clarity). The NorthStar and Yukon premixes had an average yield of 145 Bu/A while the tank mixes averaged 144 Bu/A 1 YAT.

The 4 oz/A rate of Clarity applied alone was included in the 2005-2006 experiment only so was not included in the results shown in Table 1. Nonetheless, it seems important to share the results with this low rate applied alone. Bindweed control was 89% and yield was 145 Bu/A 1 YAT. These results suggest that this readily translocated broadleaf herbicide can have a significant impact on hedge bindweed and grain corn yield the year of application and the year after treatment. This low rate (4 oz/A) of Clarity could be applied alone or in combinations with other herbicides, depending on presence of other weeds and the type of field corn hybrid being grown. Growers should be reminded that this readily translocated herbicide works best if the bindweed has significant growth (approaching the bud stage) before the corn canopy interferes with good spray coverage.

Table 1. Hedge bindweed control and grain corn yields 1 year after treatment with postemergence herbicide applications in 2004 and 2005 at Aurora, NY.

Herbicides*	Rate Amt/A	Control (%) Alone	Control (%) + 4 oz/A Clarity	Yield (Bu/A) Alone	Yield (Bu/A) + 4 oz/A Clarity
Clarity	8 oz	88	-	144	-
Clarity	16 oz	91	-	145	-
Distinct**	4 oz	89	-	143	-
Distinct**	6 oz	92	-	150	-
RU WeatherMax	22 oz	61	87	111	135
Beacon	0.76 oz	17	87	32	143
NorthStar	5 oz	83	-	149	-
Exceed	1 oz	76	87	127	143
Permit	1 oz	31	89	54	145
Yukon	8 oz	89	-	141	-
Steadfast	0.75 oz	75	86	137	127
Untreated		0	-	15	-
LSD (0.05)				25	25

* Applied with 0.25% NIS and 2.5% UAN.
** Registration pending in NY State.

Soil Health

The New Cornell Soil Health Test: Protocols and Interpretations

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Soil health emphasizes the holistic approach to soil management, including the integration of physical, biological and chemical processes. In the past, an overemphasis on chemical soil management has resulted in a loss of the biological and physical "fertility" of the soil. In two recent articles (Vol. 16 No 2 & Vol. 16 No 3), we discussed the concept of soil health, selection of soil health indicators and some results from our multi-disciplinary research efforts. Starting this spring, we are offering the new Cornell Soil Health Test, which we will discuss in this article.

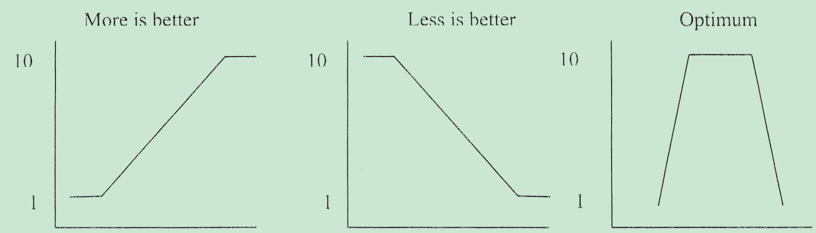
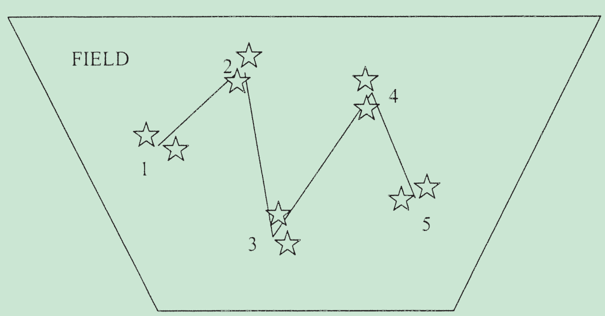


Figure 2. General patterns of the scoring curves for soil health indicators

Table 1. Indicators of physical, biological and chemical health of soil and their respective soil processes.

Soil Health Assessment Indicator	Soil Functional Processes
Physical Indicators	
Aggregate Stability	aeration, infiltration, shallow rooting, crusting
Available Water Capacity	water retention
Surface Hardness	rooting, water transmission
Subsurface Hardness	rooting at depth
Biological Indicators	
Organic Matter Content	energy/C storage, water and nutrient retention
Active Carbon Content	organic material to support biological functions
Potentially Mineralizable Nitrogen (PMN)	N supply capacity, N leaching potential
Root Health Rating	soil-borne pest pressure
Chemical Indicators	
pH	toxicity, nutrient availability
Extractable Phosphorus	P availability, environmental loss potential
Extractable Potassium	K availability
Minor Element Contents (4)	micronutrient availability, element imbalances



☆ Sampling location: take 0-6" sample with a trowel or shovel and maximum penetrometer readings at 0-6" and 6-18"

Figure 1. Layout of field sampling for soil health assessment.

The new test includes four physical, four biological, and 7 chemical indicators (Table 1). The chemical analysis is part of the standard test as performed by the Cornell Nutrient Analysis Laboratory. The physical and biological indicators were selected based on their relevance to soil processes, ease of sampling and cost of analysis. The use of the conventional chemical test has become a routine for growers and consultants, and field sampling for the new soil health test is quite similar, using disturbed soil samples. Presently, the Cornell soil health test requires that sampling be done in the spring when the soil moisture is at the field capacity and the soil's biological activity is ramping up after the winter.

The test is ideally based on a representative portion of a field that can be assumed to be reasonably homogeneous. Sections with different soil types or management history or differing slopes may be sampled separately. Also, avoid taking samples from low spots or the headlands unless you want to specifically know the soil health of these a-typical areas. In such cases, sample them separately from the rest of the field.

The soil sampling equipment is quite basic (buckets, spade, bags, etc.), but additionally penetrometer measurements are required. We recommend a basic analog dial penetrometer that is sold for less than $250. We suggest a so-called nested sampling approach where five locations in the field are visited using a "W" pattern (Figure 1). At each location two soil samples are obtained and two penetrometer measurements are made (at least 15 feet apart). All vegetation and residue cover should be removed from the soil surface, and soil is subsequently sampled to 6 inches depth. The soil material is mixed in a bucket and a composited sample is put into a zip-loc plastic bag. For penetrometer measurements, the maximum resistances are recorded for the 0-6 inches and 6-18 inches depth and entered on the submission form. As with the standard soil test, additional information needs to be entered on the form to allow for interpretation of the test results. Samples should be kept cool and out of the sun until shipping.

A challenge with the new test was the interpretation of the measured values. For example, is an aggregate stability value of 30% good or bad? Is it different for a clay loam than a sand? We developed scoring curves for this purpose to help interpret the measured values, and provide ratings on a scale of 1 to 10. Our scoring curves generally fall into three categories (Figure 2):

i. more of an indicator is better until the maximum is reached
ii. less of an indicator is better until the minimum is attained
iii. an optimum curve

Soil Health

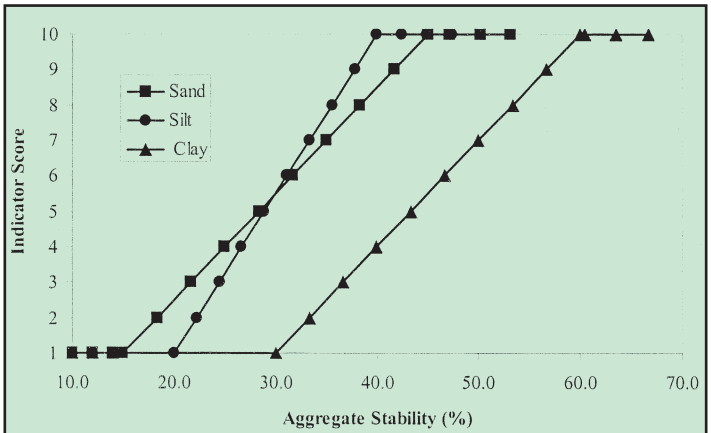


Figure 3. Scoring curve for soil aggregate stability

Examples of indicators that follow 'more is better' curves include aggregate stability, available water capacity, organic matter, active carbon and PMN. Indicators following 'less is better' are surface and subsurface hardness of the soil. Examples of indicators following an optimum curve pattern are phosphorus and pH. To develop the scoring curves, we established the upper and lower thresholds for the indicators based on information available from literature, expert opinion and by the frequency distributions of indicators in our database. For many of the indicators, interpretations were adjusted for each of the major soil textural classes of sand, silt and clay. For example, Figure 3 shows the scoring curve for soil aggregate stability. The lower and upper thresholds for sand, silt, and clay differ because clays are expected to have higher aggregate stability, even when they are physically degraded (Figure 3). So, an aggregate stability value of 33% yields a low score of 2 for a clay soil, but a score of 6 for a silt or sand.

The results of the soil health measurements are presented in a visually enhanced format in the Cornell Soil Health Test Report (Figure 4). It is color coded (unfortunately not visible in this B&W newsletter) and optimized for growers to identify areas to target their management efforts. A typical Cornell Soil Health Test Report (Figure 4) consists of:

i. Grower and field information section
ii. List of soil health measurements
iii. Values of soil health measurements
iv. Rating of each measurement on a scale of 1 to 10, scores less than 3 are color coded red, scores greater than or equals 3 but less than 7 are colored yellow and scores greater than or equals 7 are colored green.
v. List of constraints when an indicator rating is in the red (low), highlighting the soil processes affected by the low score of the indicator.
vi. Percentile rating of the indicator value in the database of soil health measurements in New York State.
vii. Overall soil quality score (out of 100)

The new Cornell Soil Health Test is now available, starting spring 2007, at a cost of $45 per sample. Through the subsidy funding of the New York Farm Viability Institute, we will be able to process a limited number of samples from NY growers at $20. We are implementing training efforts to familiarize consultants and farmers with the test, and suggest that interested farmers contact their extension agent or crop advisor about the test. For more information on the Cornell Soil Health Test, please check our website at SOILHEALTH.CALS.CORNELL.EDU

CORNELL SOIL HEALTH TEST REPORT

GROWER AND FIELD INFORMATION

	INDICATORS	VALUE	RATING	CONSTRAINT	PERCENTILE RATING*
PHYSICAL	Aggregate Stability (%)	12.4	1.0	aeration, infiltration, rooting	
	Available Water Capacity (m/m)	0.19	4.0		
	Surface Hardness (psi)	49	10.0		
	Subsurface Hardness (psi)	96	10.0		
BIOLOGICAL	Organic Matter (%)	1.9	1.0	energy storage, C sequestration, water retention	
	Active Carbon (ppm)	524	1.0	soil biological activity	
	Potentially Mineralizable Nitrogen (µgN/ gdwsoil/week)	12.8	10.0		
	Root Health Rating (1-9)	1.7	10.0		
CHEMICAL	pH (see CNAL Report)	5.7	3.0		
	Extractable Phosphorus (see CNAL Report)	14.4	10.0		
	Extractable Potassium (see CNAL Report)	111	10.0		
	Minor Elements (see CNAL Report)		10.0		50th Percentile →BETTER
	OVERALL QUALITY SCORE (OUT OF 100)		MEDIUM		66.7

Ratings on this report are based on generalized crop production standards for New York. For crop specific nutrient interpretation and recommendation, see the attached chemical test report.

Figure 4. A specimen copy of the Cornell Soil Health Test Report.

Calendar of Events

Mar. 7, 2007	Oneida County Crop Congress, VFW, Clinton
Mar. 8, 2007	Southern Tier Field Crop Workshop, Holiday Inn, Horseheads
Mar. 13, 2007	Pesticide Applicator Training Course, Monroe Tractor, Auburn
Mar. 14, 2007	North Country Crop Congress, Carthage
Mar. 15, 2007	North Country Crop Congress, Canton
Mar. 22, 2007	Pesticide Applicators' Recertification Day, Albany
June 24-26, 2007	Northeastern Branch American Society of Agronomy, State College, PA

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, 234 Emerson Hall, Cornell University, Ithaca, NY 14853.**

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