What's Cropping Up?

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The New York Nitrate Leaching Index

Karl J. Czymmek, PRO-DAIRY, Quirine M. Ketterings and Harold van Es, Dept. of Crop & Soil Sciences, Cornell University

Introduction

The Nitrate Leaching Index (LI) is an estimate of the average annual percolation expressed in inches for a particular location. The LI is based on the concept that a soil's leaching potential increases as rainfall increases. The extent of the increase depends on soil drainage characteristics. For a given annual rainfall amount, excessively well drained soils such as Howard, Adams, Hoosic, Suncook and Tunkhannock, or even the well drained soils such as Bath, Madrid, Honeoye and Ontario have a significantly greater leaching potential than poorly drained soils such as Vergennes, Swanton, Rhinebeck, Lordstown or Volusia (Figure 1).

How to calculate?[1]

The current LI rates leaching potential based on soil hydrologic group and rainfall data from weather stations around NY. The Nitrate Leaching Index is a multiplication of the Percolation Index and the Seasonal Index:

LI = Percolation Index * Seasonal Index

The Percolation Index (PI) is a function of the annual average precipitation (PA) and hydrologic soil group (Table 1). Soils with a hydrologic code "A" have the greatest percolation while soils of hydrologic code "D" have the least percolation and therefore are least conducive to leaching.

Figure 1: The Nitrate Leaching Index is designed to identify fields that are susceptible to nitrate leaching due to high percolation capacity.

Table 1: Calculation of Percolation Indices. PA is the county-based annual average precipitation in inches (see Table 2).

Hydrologic Code	Percolation Index (PI)
A	$(PA - 10.28)^2 / (PA + 15.43)$
B	$(PA - 15.05)^2 / (PA + 22.57)$
C	$(PA - 19.53)^2 / (PA + 29.29)$
D	$(PA - 22.67)^2 / (PA + 34.00)$

For soils with a hydrologic code that consists of more than one letter (e.g. "A/B", "B/C", "C/D"), its hydrologic code is determined by the presence or absence of adequate artificial drainage. If the field is artificially drained (Artificial

[1] The Leaching Index equations were supplied by E.S. Hesketh, USDA-NRCS. Amherst, MA.

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Drainage = "adequate" or "excellent") the hydrologic group moves to the first of the two classes. If the field is inadequately drained or not drained at all, (Artificial Drainage = "none" or "inadequate"), the second of the two classes is assigned. For example, a Halcott soil has a hydrologic class of "C/D". If this soil has adequate or excellent artificial drainage, the hydrologic code used is "C". If the soil is not or inadequately artificially drained, the hydrologic code "D" is assigned. For soils with a single hydrologic code, the artificial drainage does not have an impact on the hydrologic code used.

The Seasonal Index (SI) is determined by the annual precipitation (PA in inches) and the sum of the fall and

Table 2: County precipitation and runoff.

County	Precipitation Annual[1] (PA)	Precipitation Oct-March[2] (PW)	County	Precipitation Annual[1] (PA)	Precipitation Oct-March[2] (PW)
Albany	41.9	19.2	Onondaga	34.5	15.0
Allegany	37.8	16.7	Ontario	34.5	15.0
Bronx	41.9	19.2	Orange	41.9	19.2
Broome	41.5	19.0	Orleans	37.6	17.8
Cattaraugus	37.8	16.7	Oswego	37.6	17.8
Cayuga	34.5	15.0	Otsego	41.5	19.0
Chautauqua	37.6	17.8	Putnam	41.9	19.2
Chemung	37.8	16.7	Queens	46.0	23.0
Chenango	41.5	19.0	Rensselaer	41.9	19.2
Clinton	33.6	14.8	Richmond	46.0	23.0
Columbia	41.9	19.2	Rockland	41.9	19.2
Cortland	41.5	19.0	St Lawrence	36.0	16.0
Delaware	41.5	19.0	Saratoga	41.9	19.2
Dutchess	41.9	19.2	Schenectady	41.9	19.2
Erie	37.6	17.8	Schoharie	41.5	19.0
Essex	33.6	14.8	Schuyler	34.5	15.0
Franklin	36.0	16.0	Seneca	34.5	15.0
Fulton	44.3	20.5	Steuben	37.8	16.7
Genesee	37.6	17.8	Suffolk	46.0	23.0
Greene	41.5	19.0	Sullivan	41.5	19.0
Hamilton	43.4	20.4	Tioga	41.5	19.0
Herkimer	44.3	20.5	Tompkins	34.5	15.0
Jefferson	37.6	17.8	Ulster	41.5	19.0
Kings	46.0	23.0	Warren	33.6	14.8
Lewis	43.4	20.4	Washington	41.9	19.2
Livingston	34.5	15.0	Wayne	37.6	17.8
Madison	41.5	19.0	Westchester	41.9	19.2
Monroe	37.6	17.8	Wyoming	34.5	15.0
Montgomery	44.3	20.5	Yates	34.5	15.0
Nassau	46.0	23.0			
New York	46.0	23.0			
Niagara	37.6	17.8			
Oneida	44.3	20.5			

[1] USDA SCS. 1992. Agricultural Waste Management Field Handbook. Part 651 Figures 10C-1, 10C-2.
[2] C. Liezert. Agricultural Waste Management Software 2.21. October 1995. Ohio Engineering, USDA NRCS.

winter precipitation (PW, from October though March in inches): $SI = (2 * PW / PA)^{1/3}$ County-based values for both PA and PW can be found in Table 2.

Management Implications

An LI below 2 inches indicates that the potential for nitrate leaching below the root zone is low. An LI greater than 10 inches indicates that the potential for soluble nutrient leaching below the root zone is large while LI's between 2 and 10 are considered intermediate. In order to meet the requirements of the NRCS nutrient management standard (590) for N leaching, producers are expected to *implement* best management practices if the LI score for a field is high (>10). Producers are expected to *consider* the same practices on a case-by-case basis if the LI score for a field is intermediate (2-10). Best management practices recommended for soils with medium to high N leaching indices are:

- Unless the New York Phosphorus Index identifies the need for P based fertility management, manure and fertilizer application rates should be based on Cornell guidelines for meeting crop N needs.
- For corn, pre-plant (other than starter fertilizer) and early post plant *broadcast* applications of commercial nitrogen without the use of nitrification inhibitors are not recommended.
- Sidedress applications should be made after the corn has at least four true leaves.
- If starter N must be broadcast (e.g., for small grains or new seedings of grass), apply fertilizer as close to expected planting date as possible (ideally within 3 days or less).
- For row and cereal crops, including corn, maintain starter fertilizer N rates below 50 lbs/acre actual N under normal conditions.
- Manure and fertilizer applications should be adjusted based on information provided in "Nitrogen Recommendations for Field Crops In New York", Department of Crop and Soil Sciences Extension Series E01-4.
- Evaluate the need for sidedress N applications based on PSNT or other soil nitrate-nitrogen tests.
- Sod crops should not be incorporated in the fall. Chemical sod killing may be carried out when the soil temperature at a 4 inch depth is approaching 45°F. Depending on location, this will not likely take place until early October.
- Minimize fall and/or winter manure application on good grass and/or legume sod fields that are to be rotated the following spring.
- Appropriate ammonia conservation is encouraged. Losses can either be reduced by immediately incorporating manure or eliminated by directly injecting manure as a sidedress application to growing crops.
- Plant winter hardy cover crops whenever possible, regardless of, but especially when fall manure is applied (e.g., rye, winter wheat, or interseed ryegrass in summer).
- Manure may be applied in the fall where there is a growing crop. Judicious amounts of manure can be applied to or in conjunction with perennial crops or winter hardy cover crops. Applications should generally not exceed the greater of 50 lbs/ace of first year available N or 50% of the expected N requirement of next year's crop.
- Frost incorporation/injection is acceptable when soil conditions are suitable but winter applications should be made in accordance with the New York Phosphorus Index.
- Manure N application on legumes is acceptable to satisfy agronomic requirements when legumes represent less than 50% of the stand. When legumes represent more than 50% of the stand, manure may be applied at a rate not exceeding 150 lbs of available N/acre.

References

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Soil Management

Row Cultivation for Zone-Till: Potential for Reduced Inputs and Soil Conservation

Michael Glos, Harold van Es and Robert Gallagher
Dept. of Crop and Soil Sciences, Cornell University

Is there a future for mechanical weed control in reduced tillage systems? Our research has shown that zone-till is an attractive tillage option that improves soil health, but this system appears incompatible with cultivation. Because there is very little tillage involved in this system, herbicides are almost exclusively relied upon to control weeds. Moreover, many farmers in the Northeast remain reluctant to adopt it due to concern about timely weed control in wet years. With the introduction of high-residue row cultivators there is now a new option for weed control in restricted-tillage systems.

We evaluated the operating parameters of mechanical cultivation under zone-till for field corn and soybeans to optimize weed control potential while maintaining the soil conservation benefits of zone-till. We used the John Deere 886 4-row cultivator in two experiments in 1998 (a wet year) and 1999 (a dry year) at the Cornell University Musgrave Research Farm near Aurora, NY. The first experiment was concerned with the timing and rigor of cultivation. The second looked at what herbicide options best work with cultivation in a zone-till system. We evaluated the various approaches for their effect on yield and weed control, as well as soil conservation benefits.

Table 2: Soybean Yield and Weed Density as Affected by Rigor and Timing of Cultivation

	Early Cultivation		Mid Cultivation		Late Cultivation		Mean for All Timings	
Rigor	Yield (bu/acre)	Weed Density (g/m2)	Yield (bu/acre)	Weed Density (g/m2)	Yield (bu/acre	Weed Density (g/m2)	Yield (bu/acre	Weed Density (g/m2)
0 degrees	41 ab	26.0 ab	41 ab	21.3 ab	36 b	14.5 ab	40	20.6
2 degrees	43 ab	13.7 ab	43 ab	14.1 ab	40 ab	16.6 ab	42	14.8
4 degrees	46 a	9.9 a	42 ab	34.0 bc	39 ab	23.5 ab	42	22.5
Mean for all angles	44	16.5	42	23.1	39	18.2	42	19.3

[1] Values in a cell followed by the same letter are not significantly different at $\alpha = 0.05$
[2] No cultivation with full rate broadcast herbicide yielded 40 bu/acre with 55.4 g/m2 weed density

Cultivation Timing and Rigor

The first experiment investigated the effect of timing of cultivation (relative to the stage of crop growth) and the rigor of cultivation (sweep pitch angle) on weed control and crop yields. We had a factorial arrangement of 3 levels of cultivation timing relative to corn height (early (8"), mid (12"), and late (16")) and 3 levels of cultivation rigor (0, 2, and 4 degrees sweep angles). Soybean cultivations occurred at early V2, V4 and V6 growth stages. Our controls included uncultivated (weed free) and uncultivated (weedy) plots. All plots received a banded (15") in-row application of pre-emergence herbicides, except the weed-free control that received broadcast pre-emergence herbicides. We used 2qts/acre of Aatrex with 2 qts/acre of Microtech for corn and 2 qts/acre of Microtech with 0.5 lbs of Sencor 75DF for soybeans. Weed density was measured by sampling 25 square feet per treatment and drying the resulting weed biomass.

Table 1: Corn Yield and Weed Density as Affected by Rigor and Timing of Cultivation

	Early Cultivation		Mid Cultivation		Late Cultivation		Mean for All Timings	
Rigor	Yield (bu/acre)	Weed Density (g/m2)	Yield (bu/acre)	Weed Density (g/m2)	Yield (bu/acre	Weed Density (g/m2)	Yield (bu/acre	Weed Density (g/m2)
0 degrees	130 a	8.1 a	134 a	8.3 a	124 a	16.9 a	128	11.6
2 degrees	140 a	6.8 a	125 a	6.6 a	124 a	10.6 a	132	7.5
4 degrees	135 a	4.9 a	125 a	3.7 a	120 a	37.8 a	127	15.5
Mean for all angles	135	6.6	128	6.2	123	21.8	129	11.5

[1] Values in a cell followed by the same letter are not significantly different at $\alpha = 0.05$
[2] No cultivation with full rate broadcast herbicide yielded 127bu/acre with 4.3 g/m2 weed density

Table 3: Herbicides Used in Timing, Rate, and Width Study

Timing	Crop	Width	Full Rate Herbicides (per acre)
Pre	Corn	Banded/Broadcast	2 qt. AAtrex + 2 qt. Microtech
Post	Corn	Banded	21 g. Accent + 18 g. Beacon +28 g. Permit
Pre	Soybeans	Banded/Broadcast	2 qt. Microtech + 0.5 Sencor 75DF
Post	Soybeans	Banded	7 oz. Assure XL+ 5/8 oz. Classic + ¼ oz. Pinnacle

Although not statistically significant, early cultivation provided the best yield results while providing very good weed control (Tables 1 and 2). The later cultivations provided less weed control and lower yields. Timing of cultivation was more important than rigor. It is suspected, as with most row cultivations, that later cultivations prune the corn plant roots and hurt the crop.

The best yields in beans were obtained in early and mid cultivations at the 2 and 4 degree sweep setting. Late cultivations in soybean, as with the corn, reduced yields.

Herbicide Timing, Rate, and Width

In the second experiment we investigated what types of herbicide programs would best complement row cultivation in zone-till and whether herbicide rates could be reduced. We used a factorial arrangement of herbicide timing (pre-emergence or post emergence), herbicide rate (full labeled and half rate), and application width (broadcast or banded). Controls included uncultivated weed-free and uncultivated weedy plots. The herbicides used are listed in Table 3.

For the corn plots, all herbicide rates, timings and widths did well but reducing herbicide use by 75% through the use of both half rate and banding appears to reduce yields (Table 4). The uncultivated pre-emergent control yielded very high in 1998 thus giving that treatment a higher mean yield (127 bu/ac) than the cultivated treatments over the two years of the experiment. This again points out the importance of weather factors for cultivation under corn, where in the very wet spring of 1998 pre-emergent chemical control provided insurance.

For soybeans, a single cultivation pass with either full or half rate herbicide programs worked well, demonstrating that herbicide rates could be reduced by 50% and still provide adequate weed control and high yield (Table 5). Reducing herbicide use by 75% by applying at half rate and banding did not provide satisfactory weed control and resulted in lower yields. Unlike for corn, the conventional full rate broadcast herbicide treatment did not do any better than the reduced input systems.

Conservation Benefits

We used the Cornell Sprinkle Infiltrometer to quantify the effect of cultivation on water infiltration and determine how this may affect runoff potential in this system. A cultivation

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pass loosens the soil, and may therefore provide better soil infiltration capacity at a time when the crop canopy provides protection from erosive raindrops. The Cornell Sprinkle infiltrometers simulates high intensity rainfall in the field and allows for the measurement of time-to-runoff and field-saturated infiltrability. It also provides an indirect assessment of soil tilth and aeration potential. Measurements were taken two weeks following cultivation in 1998.

Table 4: Corn Yield and Weed Density as Affected by Herbicide Timing, Rate and Width

	Broadcast		Banded		All Widths	
	Yield (bu/acre)	Weed Density (g/m2)	Yield (bu/acre)	Weed Density (g/m2)	Yield (bu/acre)	Weed Density (g/m2)
Pre-emergent (Full Rate)	109 a	1.8 a	111 a	19.0 a	110	10.9
Pre-emergent (Half Rate)	116 a	8.7 a	106 a	18.9 a	111	13.8
Post-emergent (Full Rate)	**	**	111 a	2.0 a	**	**
Post-emergent (Half Rate)	**	**	106 a	10.3 a	**	**
All Pre-emergent	113	5.3	109	19	111	12.3
All Post emergent	**	**	109	6.2	**	**

1 Values in a cell followed by the same letter are not significantly different at $\alpha = 0.05$

2 No cultivation with full rate broadcast herbicide yielded 127 bu/acre with 4.3 g/m2 weed density

With average simulated rainfall equivalent to 17 inches per hour cultivation increased time to runoff by threefold. Of the cultivated sites 43% never reached runoff in an hour even after the 17 inches of simulated rainfall (Table 6). This is due to several factors. Greater infiltration means that the cultivated soil can accommodate higher water intake. Although erosion potential cannot be directly measured it is clear from our results that by increasing the time to runoff, cultivated areas are less likely to have runoff, and are more likely to provide good aeration.

Table 5: Soybean Yield and Weed Density as Affected by Herbicide Timing, Rate and Width

	Broadcast		Banded		All Widths	
	Yield (bu/acre)	Weed Density (g/m2)	Yield (bu/acre)	Weed Density (g/m2)	Yield (bu/acre)	Weed Density (g/m2)
Pre-emergent (Full Rate)	36 ab	3.8 a	36 ab	11.1 a	36	7.5
Pre-emergent (Half Rate)	39 a	8.1 a	32 b	20.1 a	36	14.1
Post-emergent (Full Rate)	**	**	36 ab	9.5 a	**	**
Post-emergent (Half Rate)	**	**	32 b	22.9 bc	**	**
All Pre-emergent	38	7.0	34	15.6	36	11.3
All Post emergent	**	**	34	16.2	**	**

1 Values in a cell followed by the same letter are not significantly different at $\alpha = 0.05$

2 No cultivation with full rate broadcast herbicide yielded 35 bu/acre with 9.2 g/m2 weed density

Residue counts were made using the beaded string method before and after cultivation. We used a 25-ft string with beads every six inches. Two measurements were taken in each plot.

Cultivation reduced residue considerably versus no cultivation (Table 7). Increasing sweep angle from 0 degrees to 2 or 4 degrees resulted in a significant decrease in residue cover. Reducing surface residue is less of concern at the time of cultivation, because the crop canopy has generally been sufficiently developed to reduce erosion rates during heavy storms in the summer. Still, using the less rigorous cultivation (0-degree sweep angle) helps preserve surface cover.

Table 6: Cornell Sprinkle Infiltrometer Results

Cultivation	Average Steady State Infiltration Rate (in/hr)	Percentage of sites that reached runoff in 60 minutes
Cultivated	9.78	57%
Not Cultivated	7.80	100%

Conclusions

Combining zone-till with mechanical weed control using high-residue cultivators was found to be a viable option to using herbicides alone for weed control. Herbicide rates could be cut by up to 50% by either banding at full rate or broadcasting at half rate without reducing yields and still providing good weed control. The success of both pre-emergent and post-emergent programs gives farmers several flexible options. It was found that the best yields, while still maintaining good weed control, were obtained by cultivating early at low to mid sweep angle settings. If unable to cultivate all acreage, broadcast post-emergent sprays can still be used without a reduction in yields. This is an important consideration as the wet springs in our Northeastern climate may make cultivation windows narrow in some years. All cultivation timings and sweep angles increased infiltration and reduced runoff, compared to uncultivated treatments, but the less rigorous cultivations maintained higher residue levels at the surface.

Table 7: Effect of Cultivation Rigor on Residue Cover

Treatment	Pre-Cultivation % Cover	Post-Cultivation % Cover	% Reduction in Cover
No Cultivation	52 a	52 a	0 a
Cultivation 0 degrees	47 a	24 b	47 b
Cultivation 2 degrees	45 a	16 c	64 c
Cultivation 4 degrees	53 a	15 c	71 c

Values in a column followed by the same number are not significantly different at $\alpha = 0.05$

The use of field cultivators can be made more attractive by combining mechanical weed control with nitrogen sidedress application and possibly banded herbicide application into a one-pass operation. In the past year we have retrofitted our cultivator to perform these multiple tasks with considerable success.

Acknowledgements

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Weed Management

Residual Herbicides Improve Postemergence Large Crabgrass Control in Corn

Russell R. Hahn and Paul J. Stachowski
Dept. of Crop and Soil Sciences

The first line of defense against large crabgrass in field corn is the preemergence (PRE) application of an acetamide herbicide (Micro-Tech/Partner, Frontier, Dual II Magnum), Prowl, or Princep. Until recently, Bladex was also a choice for PRE crabgrass control, and unlike the other PRE herbicides, Bladex also had good postemergence (POST) activity against this annual grass. As a result, Bladex was widely used when PRE herbicides failed due to a lack of rainfall activation or when excessive rainfall prevented timely PRE herbicide applications. The loss of Bladex from the market and increased interest in total postemergence weed control programs has forced growers to explore alternatives for POST crabgrass control.

Conventional Programs

POST control programs with conventional hybrids depend on Basis Gold for crabgrass control with mixed results. One of the limitations with Basis Gold is that the maximum height for large crabgrass control is 1 inch and growers often find themselves in situations where the crabgrass is taller than 1 inch. Another limitation for Basis Gold is the lack of residual control for late-emerging crabgrass. While Basis Gold is a mixture of Accent and Matrix in a l:l ratio pre-mixed with atrazine, a new product, Steadfast, is a mixture of Accent and Matrix in a 2:1 ratio. Like Basis Gold, the Steadfast label claims control of crabgrass up to 1 inch and provides limited residual activity against crabgrass. Both labels allow tank mixing these herbicides with an acetamide herbicide or with Prowl to provide residual control of late-emerging grasses such as crabgrass.

An experiment was conducted at the Valatie Research Farm in 2001 to evaluate the efficacy of early postemergence (EPO) applications of Basis Gold and Steadfast alone and in combinations with 1.8 pt/A of Prowl when the crabgrass was 0.5 inch tall. In addition, Basis Gold and Steadfast were applied mid-postemergence (MPO) when crabgrass was 3 inches tall. Late-season crabgrass control with EPO applications of Basis Gold and Steadfast alone averaged 17% and yielded an average of 67 bu/A of grain corn (Table 1). The EPO tank mixes of these herbicides with Prowl provided 91% crabgrass control and a yield of 87 bu/A. The MPO applications averaged 44% control and yielded 63 bu/A. The untreated check yielded 15 bu/A.

Table 1. Large crabgrass control ratings and corn yields with early and mid-post emergence (EPO and MPO) herbicide applications at Valatie in 2001.

Herbicides	Rate Amt/A	When Appl.	Control (%) Crabgrass	Foxtail	Ragweed	Yield (Bu/A)
Basis Gold*	14 oz	EPO	17	100	100	69
Basis Gold Prowl*	14 oz 1.8 pt	EPO EPO	90	95	100	93
Basis Gold*	14 oz	MPO	45	99	100	67
Steadfast AAtrex*	.75 oz 0.5 pt	EPO EPO	17	97	80	66
Steadfast AAtrex Prowl*	.75 oz 0.5 pt 1.8 pt	EPO EPO EPO	92	96	77	80
Steadfast AAtrex*	.75 oz 0.5 pt	MPO MPO	43	86	75	59
Untreated	-	-	0	0	0	15
LSD (0.05)			15	14	28	13

*Applied with 1% (v/v) COC and 2% (v/v) 28% UAN.

Herbicide-Resistant Programs

Emerged crabgrass will be controlled with POST applications of glyphosate (Roundup, Touchdown, etc.) or of glufosinate (Liberty) when using Roundup Ready or Liberty Link corn hybrids, respectively, but these applications may not provide season-long crabgrass control. In an experiment with Liberty Link corn at Valatie in 2001, an EPO application of Liberty alone provided only 35% late-season crabgrass control and a yield of 82 bu/A, while an EPO application with a half rate of an acetamide herbicide (Define, which is not registered for use in NY), controlled 100% of the crabgrass and produced a grain-corn yield of 108 bu/A (Table 2). In both the conventional and herbicide-resistant programs, the addition of a reduced rate of a residual herbicide resulted in improved crabgrass control and yields.

Table 2. Large crabgrass control ratings and corn yields in Liberty Link corn at Valatie in 2001.

Herbicides	Rate Amt/A	When Appl.	Crabgrass Control (%) 6/19	8/16	Yield (Bu/A)
Define* AAtrex	12 oz 1.0 qt.	PRE PRE	97	98	98
Liberty AAtrex AMS	28 oz 1.0 qt 3.0 lb	EPO EPO	67	35	82
Liberty Define AAtrex AMS	28 oz 6.0 oz 1.0 qt. 3.0 lb	EPO EPO EPO	100	100	108
Untreated	-	-	-	-	40
LSD (0.05)			8	10	19

*Define is not registered for use in NY State.

New Nutrient Management Software Now Available

Cornell Cropware *Version 1.0*

Caroline Rasmussen & Greg Albrecht, Dept. of Animal Science; Karl Czymmek, Pro-Dairy; and Quirine Ketterings, Dept. of Crop and Soil Sciences

Cornell Cropware is a computer program that assists nutrient management planners and livestock producers in generating nutrient management plans that meet NRCS standards. Cornell Cropware contains equations and coefficients needed to implement Cornell Guidelines for meeting crop requirements with manure and fertilizer nutrients. The software package is a stand-alone program with an extensive help system. The program is easy to use, flexible and complete with the following features:

- *Users can construct, print and save customized reports. Reports can be exported to word processing, spreadsheet and mapping/GIS software.*

- *A complete crop rotation record is stored for each field; information from each year is automatically "rolled over" to the next year.*

- *Phosphorus recommendations can be generated from soil test reports from Cornell (Morgan extraction), A&L Laboratories Inc. (Modified Morgan and Mehlich-III extraction), Brookside Laboratories Inc. and Spectrum Analytic Inc. (Mehlich-III extractions).*

- *Corn crop nitrogen requirements can be based on soil type and drainage dependent Cornell yield estimates or user-defined crop yields where supported by yield records.*

- *The quantity of manure can be estimated from animal units, bedding and wastewater data entry or directly from producer spreading records. The program also provides means for estimating monthly storage and removal quantities in order to match time of spreading with available manure.*

- *In addition to user-customized reports, management reports include: a manure application list for the tractor, monthly spreading calendar for planning timing of manure applications, nutrient management plan report, farm crop and animal summary, fertilizer management report, and a fertilizer shopping list.*

- *Site-specific management of hyrologically sensitive areas is a key system component. Environmental factors include inputs for Highly Erodible Land, soil erosion estimates, buffer widths and other hydrologic sensitivity factors. The program will calculate and report the New York nitrogen leaching index and phosphorus runoff index values for each field.*

The program is available to any New York user at no charge. To obtain a copy of the program, tutorials and supporting documents or inquire about training sessions:

- Access http://www.css.cornell.edu/nutmgmt/index.html and click on "Cornell Cropware" (or)

- Contact Michelle Cole, 130 Morrison Hall, Cornell University, Ithaca NY 14853. E-mail: mlc44@cornell.edu. Phone: (607) 255-7712.

Calendar of Events

January 7-10, 2002	Northeastern Weed Science Society Annual Meeting, Philadelphia, PA
January 8-9, 2002	NYS Agri-Business Association Annual Meeting, Rochester, NY
January 22, 2002	Western NY Corn Congress, Batavia, NY
January 23, 2002	Finger Lakes Corn Congress, Waterloo, NY
January 30, 2002	Dairy Forage Expo, Albany, NY
February 7, 2002	Cayuga County Crop Day, Auburn, NY
February 10-13, 2002	Weed Science Society of America, Reno, NV
February 27, 2002	Northern NY Corn Congress, Chazy, 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, 234 Emerson Hall, Cornell University, Ithaca, NY 14853.**

Cornell Cooperative Extension

Dept. of Crop and Soil Sciences
234 Emerson Hall
Cornell University
Ithaca, NY 14853

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