Best Management Practices for the Use of Dairy Manure; Towards Calibration of the Phosphorus Runoff Index in Northern NY.

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Background:

Environmental regulations, high fertilizer prices, improved manure handling and storage technologies, and steadily increasing animal densities on farms force us to re-examine manure management. Maintaining a high quality, high yielding crop has always been a priority for farmers. We must now work to sustain or even increase those yields while minimizing the potential for nutrient loss and this requires the development of a set of management options that allows manure nutrients to be most efficiently used.

The greatest concern in applying manure is typically the fate of phosphorus (P) and nitrogen (N). These elements are macronutrients that are needed in large quantities so producers want to ensure these nutrients are readily available for crop uptake. But, both N and P are potential pollutants if lost from the farm fields and transported to surface and/or groundwater. It is critical to understand the potential environmental loss pathways of these nutrients as minimizing loss through one pathway may lead to increasing losses through others. For instance, surface application of manure without incorporation may reduce N leaching but increase P accumulation and/or P runoff. Incorporation of manure may reduce P runoff but if amounts are not adjusted, it may lead to increase N leaching.

We are re-evaluating current manure management guidelines with an eye on both production (yield and quality) and protection of the environment. This is best done by combining laboratory work with making observations and measurements in “real world” settings on farms and in systems that are representative of common agricultural practices in the Northern New York region. Field-scale trials on research stations paired with on-farm monitoring of runoff will enable us to translate results of recent laboratory studies to real farm situations.

Methods:

Our primary objective for this study is to quantify losses of P and N in tile lines and surface runoff while evaluating the effects of manure application on orchardgrass yield, quality and nutrient uptake. We established 12 large (60' x 500') orchardgrass plots designed to collect runoff and drainage water on the Willsboro Research Farm. The 12 plots allow for the application of 4 fertilizer/manure treatments and provide us with the ability to measure and collect runoff (rainfall simulations) and leachate from central tiles lines that empty in monitoring manholes.

In 2004/2005, we monitored the plots for their current soil test P status, yield and grass quality. Each plot was analyzed for soil fertility assessment (standard soil fertility assessment for 0-8 inch depth samples). A profile of soil test status was generated for each plot using deep cores, and sampling at 9 depths as well. This assessment is needed to determine vertical transport of manure nutrients once treatments are applied. This baseline condition will make detection of P buildup and movement possible. In 2005, nutrient loss into surface water was evaluated using a portable rain simulator and collection frames. The specific protocol for the rain simulation (http://www.ars.usda.gov/sp2UserFiles/Place/19020000/NationalPprotocolrev.pdf) was developed by the National Phosphorus Project and was chosen because it allows us to compare Northern NY data with data from projects in other states. It also allows for additional comparisons. Runoff simulations were done after first cutting and leachate was collected throughout the season. Simulated rainfall was applied to the plots for two consecutive days at a rate of 4.15 cm hr^{-1} or 1.63 inches per hour. Water samples were collected from paired plots on both days during simulated rain events with the sample collection lasting 30 minutes from the time of initial runoff. This water was then analyzed for ortho-phosphorus, the directly available form of P. The rainfall simulator was used on-farm and at demonstration sites in Northern NY as well to enhance farmer and agricultural industry awareness of P loss pathways and the need for research to be better able to predict actual runoff from farm fields. The background data from 2005 (i.e. before any treatments are applied) are essential for assessment of plot to plot variability and comparison of changes upon manure treatments in the next growing seasons.

Research Results:

General soil fertility of topsoil: Soil P levels were classified as "low" and "very low," which is desirable for the start of this project. Potassium status for these Group III soils is "medium" and organic matter levels are high, averaging over 8%. Samples generally had little or no detectable nitrate at the time of sampling. Full details are presented in Table 3.

Depth profiles: The results of the initial deep soil profile assessments are represented in Figures 1 – 4 of Appendix A. Phosphorous concentrations are very low to low at all depths, with a noticeable increase in concentration (to a medium classification) at the bottom of the plow layer. Potassium levels fall into the "medium" range (and some "high" values at the surface) and are relatively uniform among plots and at depths greater than 2 inches. Extractable calcium and pH both increase with depth, suggesting Ca leaching from the surface soil. This could cause potential interactions with P dynamics as P containing water moves toward tile lines.

Yields: Yields of first and second cutting are shown in Table 2. The average 2005 yield was 5.8 tones of dry matter per acre, over twice the statewide average yield of 2.3 tons/acre, as reported by the National Agricultural Statistics Service. Yields were very similar among plots, making direct comparisons between future treatments possible.

Runoff data: Concentrations of ortho-phosphorus in runoff water were very low, as shown in Table 3. When the source water P concentration is subtracted from the runoff sample concentration the net P load is effective zero, which establishes an unambiguous baseline for future measurements. Other on-farm NNY runoff measurements have documented P loads ranging from 0.09 to 1.98 mg/L inorganic (directly available) phosphorus.

Leaching data: Laboratory analysis is still in progress for the 36 leachate samples collected from the lysimiter plot manhole sites. Results will be reported as soon as they become available. These data will also be used to normalize future post-manure treatment leachate samples.

Conclusions/Outcomes/Impacts:

Our measurements to date have provided us with a comprehensive categorization of the newly installed lysimeter (drainage) plots at the Willsboro research farm. Runoff and leaching data show very low levels of P movement over the surface and through the profile of the plots. We have located a local source for the 2006 liquid manure treatments and plan on application of manure following first cutting in 2006. This will allow us to document the impacts of manure application method (surface application versus partial incorporation using an aerway, versus a fertilizer-based and a no nutrient control treatment; i.e. 4 treatments in 3 replications each) on P buildup over the soil profile, as well as leaching and runoff risk.

Although this project is still in process our extension events (especially P index and rainfall simulation sessions) have shown a growing interest by farmers and a gradual shift in perception that the P index, while sometimes inconvenient, is conceptually sound and not incompatible with efficient farm operations. Both farmers and consultants are increasingly realizing that both conventional and innovative manure management options do provide for adequate flexibility.

Outreach:

The rain simulator and our on-going work with P management research were presented during a 2 day session at the Lewis County Agri-business field days in Lowville, NY on September 8th and 9th, 2005. This event was coordinated by Lewis County Cornell Cooperative Extension and our involvement was facilitated by field crops educator Jennifer Beckman. Attendance was estimated at 300 people. We had committed to provide three seminars but due to demand, we kept our station staffed for the full duration of the event and interacted with a number of farmers and consultants. Feedback was generally positive and often fell into the following categories:

- Concern that future nutrient management guidelines will only reduce application options and surprise to realize that significant work is being done to expand management options.
- Management options of very high P fields are limited; how can we remediate very high testing soils?
- Micro-nutrient issues (especially Cu).
- Manure handling questions, especially in light of the Black River manure spill.

Most people were very pleased to see that the rain simulator approach to P runoff evaluation provides a more “real-world” evaluation of field situations than what was previously done. An article documenting this outreach effort and our ongoing P research was prepared for Country Folks and local newspapers by Kara Dunn (see Appendix B). Our Northern NY project website (http://nmsp.css.cornell.edu/projects/nny.asp) now contains six factsheets and over 200 pages of soil test summary data from the six NNY counties.

Next steps:

We will continue to measure orchardgrass yield and quality in 2006 following manure application after 1st cutting, and to intensify measurements of soil and water nutrients. The deep soil core sampling (0-2, 2-8, 8-12,12-16,16-20, 20-24, 24-28, 28-32, 32-36 inches) will allow us to monitor nutrient movement through the soil profile over the years. Surface runoff water samples will be collected after manure treatments are applied following 1st and 2nd harvests (assessment over time). In 2006, we will also sample tile flow for both natural events (especially spring draining) and induced tile flow (irrigation) during the growing season.

We proposed to couple the research farm data from Willsboro with runoff data to be collected at three cooperating farms in Northern NY. These would be the same farms that were screened and sampled in 2003-2004 for the P-Index calibration studies. Actual site selection will be done once the results of our laboratory-based incubation study with 12 Northern NY soils are summarized (to be completed by November 2005). The latter study is conducted to determine if P dynamics are dependent on the soil's iron (Fe), aluminum (Al) and calcium (Ca) content and P saturation (representing a soil's ability to hold on P). Phosphorus sorption capacities of the 12 Northern NY soils will be determined in the fall/winter of 2006 (undergraduate independent research project). On-farm sites will allow us to evaluate common management scenarios that differ from the conditions found in the controlled research station environment.

Acknowledgments:

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Literature Cited:

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  - NNYADP 1: Why is phosphorus an issue for New York farms?
  - NNYADP 2: Trends in soil phosphorus status.
  - NNYADP 3: Developing a phosphorus index for Northern New York soils.
  - NNYADP 4: Limiting phosphorus use for corn growing in Northern New York.
  - NNYADP 5: The impact of starter P on corn silage quality.
  - NNYADP 6: Phosphorus runoff: calibrating the P index for Northern New York.
- New York Agricultural Statistics. 2004 Annual Fieldcrops Bulletin: http://www.nass.usda.gov/ny/Bulletin/2005/Annp015-22-05.pdf.
- Watertown Journal and Republican, "Lewis County Farmers get NNY P-Index Update" September 28, 2005. p. 13-B.

Person to contact for more information:

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Photos:

First cutting in 2005.

First harvest, June 22, 2005.

Table 1. 2004 and 2005 field operation spanned from mid April until late August.

2004/2005 Willsboro event schedule	
June 17, 2004	Deep core sampling
June 28, 2004	1st hay cutting
September, 2004	Preliminary rain simulation
September 27, 2004	2nd hay cutting
April 13, 2005	Leachate sampling (12 plots)
April 26, 2005	Top dress (75 lbs/acre N)
May 24, 2005	Lechate sampling (12 plots)
June 22, 2005	1st hay cutting
June 23, 2005	Rain simulation / runoff collection
June 24, 2005	Rain simulation / runoff collection
August 22, 2005	2nd hay cutting

Table 2. 2004 and 2005 Orchard grass yields for the 12 plots. Data are expressed in tons of dry matter.

	2004			2005		
	1st Cut	2nd Cut	Total	1st Cut	2nd Cut	Total
Plot	--------Yield (tons of dry matter)--------			---------Yield (tons of dry matter)--------		
1	2.41	2.90	5.31	2.05	3.44	5.49
2	2.70	2.72	5.42	2.07	2.81	4.88
3	2.99	2.67	5.66	3.37	2.81	6.17
4	2.86	2.84	5.70	2.02	2.92	4.95
5	3.05	2.46	5.51	2.94	2.40	5.35
6	3.69	2.65	6.34	2.42	2.85	5.27
7	2.89	3.07	5.96	3.14	3.23	6.38
8	2.94	2.64	5.58	1.85	2.89	4.74
9	2.97	3.06	6.03	1.68	2.91	4.58
10	3.54	2.65	6.19	1.98	2.84	4.82
11	2.91	2.92	5.83	1.86	2.53	4.39
12	3.32	2.48	5.80	2.37	2.74	5.11
Mean	3.02	2.76	5.78	2.31	2.86	5.18

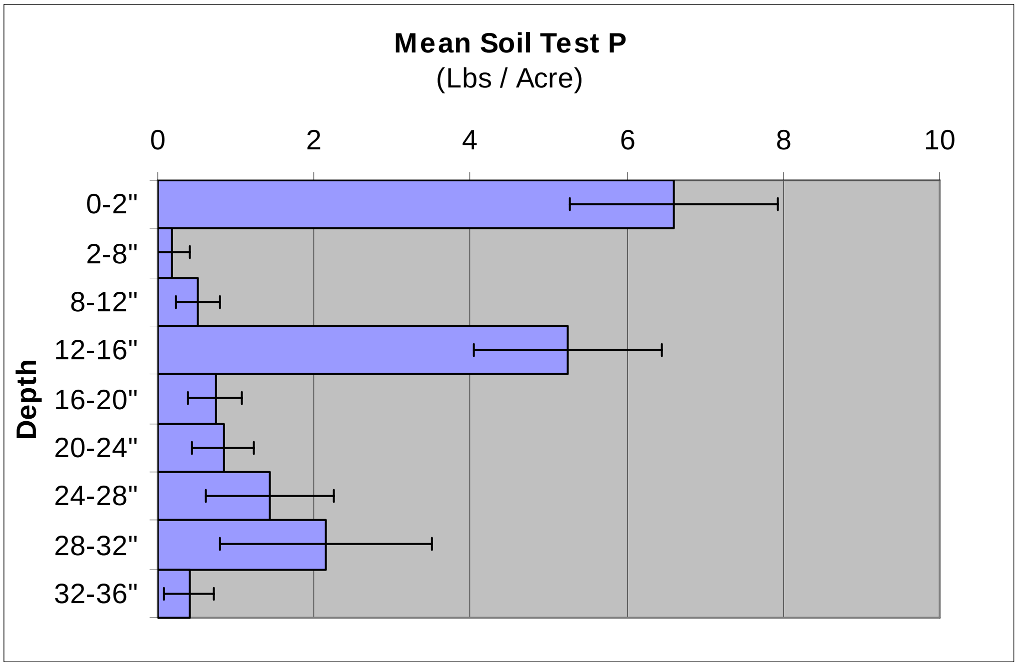

Figure 1. Soil test P levels are Low to Very Low throughout the profile.

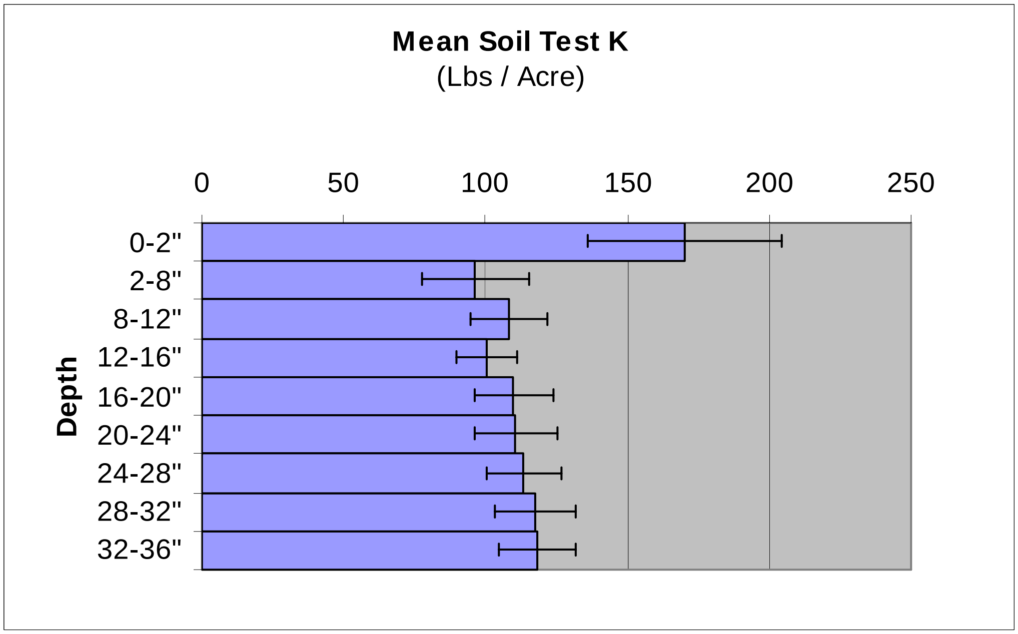

Figure 2. Potassium is evenly distributed at depths below the surface and Ranges from “medium” to “high.”

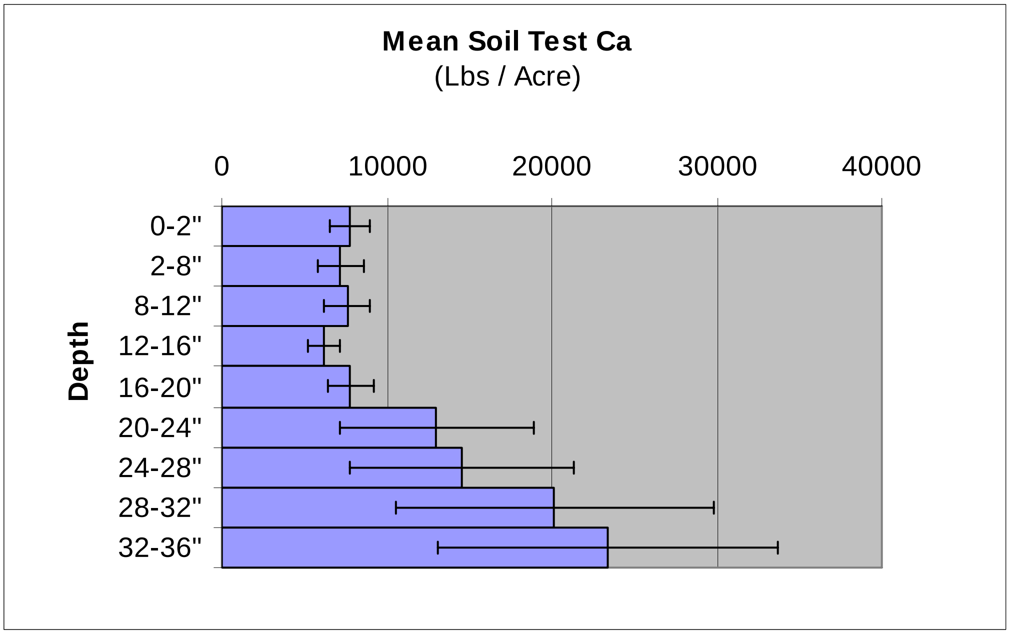

Figure 3. Calcium, a cation, seems leached from the surface horizons to Deeper layers (below approximately two feet).

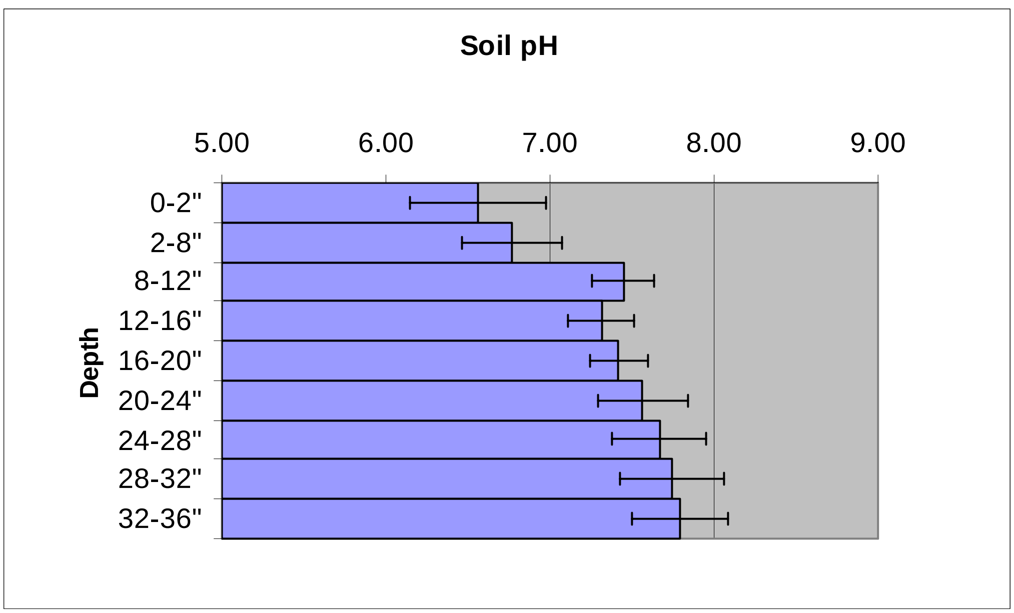

Figure 4. The pH of the soil becomes more basic as depth increases.

Table 3. Soil Fertility Assessment - NNY Manure Management Study - Willsboro NY.

Plot	P	K	Mg	Ca	Fe	Al	Mn	Zn	Cu	pH	OM	NO_3
	----	----	----	lbs / acre	----	----	----	----	----		%	ppm
1	7.6	88	580	6694	2.40	17.80	32.00	1.04	3.2	7.05	7.49	5.90
2	8.0	82	671	7532	2.60	20.40	29.60	1.24	3.4	7.16	7.39	0.00
3	12.2	78	517	6704	2.40	18.20	36.20	0.52	2.6	7.07	6.89	0.00
4	5.8	82	637	6118	1.40	18.00	42.00	1.00	2.8	7.12	6.74	0.00
5	8.2	86	701	5980	1.40	14.20	42.00	1.12	2.4	7.17	7.09	0.00
6	3.6	64	399	3528	1.60	14.00	47.00	0.56	1.4	6.63	4.96	0.00
7	6.0	110	744	7818	1.80	19.60	28.00	0.82	3.8	7.09	7.82	6.15
8	5.2	114	818	8278	3.00	27.20	26.20	1.24	3.8	7.04	8.46	8.85
9	9.4	138	1017	10214	3.00	26.20	36.80	0.88	3.6	7.36	10.87	6.62
10	6.4	128	1014	9610	2.60	25.80	38.40	0.66	4.6	7.37	9.15	0.00
11	3.0	144	1177	8526	2.00	26.20	34.40	0.40	3.0	6.99	10.27	6.35
12	4.6	116	1250	7194	1.80	28.40	41.80	1.20	3.0	6.79	9.67	0.00
Mean	6.7	103	794	7350	2.17	21.33	36.20	0.89	3.1	7.07	8.07	2.82

Table 4. Runoff P concentrations from the 12 plots. Concentrations are very low.

	Agronomic Soil Test P (Morgan P)		P concentration (mg/L)							
			June '05 Day 1		June '05 Day 2		Aug '04 Day 1		Aug '04 Day 2	
Plot			Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
	ppm	lbs/ acre	--mg/L				--			
1	12.4	24.9	0.19	0.07	0.18	0.03	0.09	0.01	0.04	0
2	3.5	6.9	0.19	0.00	0.19	N/A	N/A	N/A	0.10	N/A
3	3.6	7.2	0.29	0.05	0.16	0.00	0.29	0.12	0.07	0.05
4	2.1	4.2	0.12	0.03	0.09	0.02	0.11	0.06	0.17	0.04
5	5.7	11.4	0.14	0.04	0.13	0.03	0.23	0.03	0.20	0.02
6	3.2	6.4	0.21	0.00	0.11	0.03				
7	3.2	6.4	0.21	0.00	0.17	0.01				
8	4.0	8	0.25	6.00	0.18	0.03				
9	3.4	6.9	0.24	0.01	0.18	0.02				
10	5.8	11.7	0.17	0.02	0.12	0.00				
11	3.4	6.7	0.11	0.01	0.11	0.02				
12	2.4	4.8	0.13	0.01	0.11	0.01				
Source			0.12	0.05	0.13	0.01	0.01	N/A	0.13	N/A

Table 5. 2005 orchardgrass forage quality, Manure Management Study, Willsboro, NY.

	Plot	CP	ADF	NDF	TDN	NEL	Ca	P	K
		% DM	% DM	% DM	% DM	Mcal/lb	% DM	% DM	%DM
First Cutting	1	15.1	35.9	62.9	58	0.51	0.41	0.18	1.81
6/22/2005	2	10.8	37.7	66.3	57	0.47	0.4	0.17	2.08
	3	12.5	39.5	66.1	57	0.48	0.45	0.17	1.93
	4	11.8	36.5	68.4	56	0.45	0.37	0.18	1.62
	5	10.8	43.1	72.1	55	0.41	0.41	0.19	1.93
	6	14.9	41.5	66.5	57	0.47	0.42	0.22	1.29
	7	15.0	38.7	65.8	57	0.48	0.40	0.18	1.89
	8	13.4	40.2	68.0	57	0.46	0.39	0.19	1.76
	9	13.3	38.8	65.7	57	0.48	0.41	0.19	1.99
	10	12.6	37.6	64.1	58	0.50	0.46	0.18	2.37
	11	10.5	39.8	66.5	57	0.47	0.34	0.17	1.88
	12	12.4	40.1	63.9	58	0.50	0.42	0.25	1.90
	Mean	12.6	39.2	66.4	57	0.50	0.4	0.20	1.90
Second Cutting	1	18.0	39.2	63.0	58	0.51	0.50	0.23	2.06
8/22/2005	2	18.3	38.5	62.0	58	0.52	0.50	0.26	2.18
	3	18.1	39.0	63.1	58	0.51	0.48	0.24	2.25
	4	16.6	38.4	59.6	59	0.54	0.59	0.24	1.78
	5	17.3	40.3	62.5	58	0.51	0.54	0.27	1.96
	6	20.3	38.4	63.2	58	0.51	0.70	0.30	1.19
	7	16.4	38.4	61.6	58	0.52	0.49	0.22	2.03
	8	17.7	38.0	67.0	57	0.47	0.50	0.24	2.00
	9	17.1	38.3	65.5	57	0.48	0.51	0.26	2.09
	10	17.0	39.6	62.8	58	0.51	0.54	0.26	2.46
	11	15.9	41.3	65.1	57	0.49	0.51	0.28	2.34
	12	16.8	40.5	65.9	57	0.48	0.48	0.25	2.20
	Mean	17.5	39.2	63.4	58	0.50	0.50	0.30	2.00

% DM = Percent Dry Matter

Table 6. Phosphorus concentrations in tile line water were typically very low, often below the detection limits of the analysis.

		Leachate Analysis								
Sample date	Plot	P	K	Ca	Al	Fe	Zn	Cu	S	Na
		mg / L								
4/16/04	1	<det	0.249	31.24	0.146	0.005	0.015	0.013	7.243	7.23
	2	<det	0.243	28.96	0.058	<det	<det	<det	8.844	6.61
	3	<det	0.266	30.57	0.163	0.006	0.004	<det	9.713	9.24
	4	<det	0.213	27.83	0.020	0.006	0.009	0.007	3.504	5.02
	5	<det	0.265	34.32	0.043	<det	<det	<det	3.409	6.27
	6	<det	0.139	24.02	0.069	0.007	0.018	<det	3.674	4.99
	7	<det	0.219	26.14	0.014	<det	0.008	0.012	15.892	18.19
	8	<det	0.197	36.73	0.021	0.013	0.026	0.008	14.779	14.02
	9	<det	0.884	32.32	0.848	0.010	0.021	<det	6.279	7.92
	10	<det	0.280	33.47	0.118	<det	<det	<det	3.797	4.09
	11	<det	0.855	27.75	0.174	0.034	0.027	0.007	7.137	8.53
	12	<det	2.305	22.47	0.297	0.097	0.018	0.011	3.300	6.31
4/13/05	1	<det	0.317	41.52	0.048	0.013	0.006	<det	7.654	7.01
	2	<det	0.364	48.04	0.003	0.005	0.003	<det	8.727	5.51
	3	<det	0.338	48.48	0.066	<det	<det	<det	9.781	11.07
	4	<det	0.320	43.69	0.165	0.013	0.029	<det	4.463	7.63
	5	<det	0.378	43.56	0.074	0.004	0.012	<det	3.495	10.21
	6	<det	0.178	46.92	0.018	0.005	0.006	0.008	3.850	5.44
	7	<det	1.224	44.15	0.287	0.020	0.021	<det	16.780	17.67
	8	<det	4.141	38.18	0.260	0.031	0.045	0.016	7.600	11.15
	9	0.064	7.193	23.95	0.117	0.035	0.028	<det	2.355	5.49
	10	<det	0.428	46.89	0.033	0.004	0.011	<det	4.149	5.55
	11	<det	5.305	16.58	0.115	0.066	0.004	<det	2.453	4.77
	12	0.064	2.466	27.48	0.248	0.119	0.022	<det	3.042	5.93
5/13/05	1	<det	0.407	48.11	0.006	0.008	0.014	<det	6.895	6.17
	3	<det	0.411	45.57	0.028	0.006	0.018	0.010	7.950	10.87
	4	<det	0.350	42.17	0.029	0.005	0.006	0.009	3.586	7.62
	5	<det	0.494	40.88	0.104	0.004	0.016	<det	2.431	11.54
	6	<det	0.184	39.71	0.120	0.004	0.018	0.008	3.207	5.78
	9	<det	0.227	40.90	0.051	0.009	0.014	0.015	7.495	9.88
	10	<det	0.359	42.23	0.024	<det	0.009	0.007	3.129	5.35
	11	<det	0.170	34.70	0.011	0.003	0.015	<det	9.041	9.00
	12	<det	0.191	25.33	0.048	0.016	0.035	0.013	7.009	9.30
5/24/05	1	<det	0.279	29.79	0.100	0.017	0.018	<det	6.765	8.68
	2	<det	0.392	29.59	0.066	0.017	0.008	<det	6.811	6.15
	3	<det	0.506	26.80	0.081	0.033	0.021	0.009	5.220	6.09
	4	<det	0.288	34.55	0.090	0.032	0.016	0.012	3.303	5.53
	5	<det	0.229	30.21	0.069	0.010	<det	<det	2.444	5.14
	6	<det	0.186	24.24	0.079	0.034	0.025	<det	2.749	4.84
	7	0.076	2.666	29.83	0.152	0.085	0.016	0.013	2.678	5.09
	8	0.065	3.678	35.64	0.186	0.082	0.025	0.009	3.726	7.94
	9	<det	4.031	32.70	0.161	0.083	0.022	<det	4.480	7.59
	10	0.064	1.552	34.88	0.058	0.022	0.012	0.012	3.301	5.63
	11	<det	4.820	30.03	0.101	0.061	0.022	0.015	3.757	7.81
	12	<det	3.366	32.56	0.232	0.125	0.021	<det	3.778	7.73

<det = the value is below the detection limits of ICP analysis.

Appendix B

Lewis County Farmers Get NNY P Index Update

By Kara Lynn Dunn

<Draft of article that is scheduled to appear in "Country Folks" magazine>

At the recent Lewis County Agri-Business Field Days in Lowville, Jason Kahabka an extension associate from the Department of Crop and Soil Sciences at Cornell University shared information about efforts to evaluate and improve New York's Phosphorus management guidelines. Working on regional farms and research stations, researchers hope to identify the strengths and weaknesses of the current system for rating farm fields for their risk of contributing phosphorus to surface waters where it could contribute to eutrophication.

Beginning in 1999, federal standards required NY to develop a Phosphorus Index that now shapes the way farmers apply fertilizers and manure. "Most farmers are interested to know how the P Index will affect their nutrient management planning and their manure application decisions," Kahabka said. "Currently, the P Index is the best option we have to help farmers assess their risk for nutrient runoff based on their individual farm circumstances.

"The research team involved in developing the P Index for New York State has worked hard to balance environmental protection needs with agricultural needs," he said. "Each field is unique and our testing at farms and at the Cornell Baker Research Farm in Willsboro creates a bridge between the lab science and real world conditions on farms."

NY P Research Project demonstrations at field days on farms and at fairgrounds events allow researchers to share the latest information locally and to demonstrate rainfall simulation equipment. The simulator is used to apply the amount of rainfall expected from a typical storm with drops equivalent in size to actual raindrops so they dislodge soil as actual rain would.

Among the multiple factors affecting runoff are land slope, the type of cover crop and field management practices that can mix in an almost infinite number of combinations, Kahabka said.

"In the lab we begin to develop an understanding of the fundamentals and how the processes work together in the big picture. Through a continuum of projects – in the lab, on farms and at research stations - we are able improve our understanding of P dynamics, and that knowledge helps farmers adapt to the guidelines with flexibility for their manure management," Kahabka said.

Research to date has shown that once phosphorus reaches high levels in the soil, the yield response of a corn crop flattens out and it does not pay to add additional phosphorus in fertilizer or manure to that crop. It is also known that at levels above the critical agronomic point for crops the loss of phosphorus into surface water can increase rapidly.

The NY P Research Project team has analyzed nearly 118,000 soil samples collected in New York State from 1995 to 2001. Forty-seven percent of the soils tested statewide measured high or very high in phosphorus. Data from Northern New York suggests that soil P levels have been steadily increasing over the last 40 years, and that increase has accelerated over the past 10-20 years.

The current P index does not specifically evaluate soil type in assessing runoff risk. Cornell University Cooperative Extension educators from across Northern New York have supplied samples of 12 common soil types found throughout the region to the NY P Research Project for analysis. The results of this study will help researchers determine if management guidelines for phosphorus could be improved to make them more soil-type specific.

The P Research Project is funded in part by the Northern New York Agricultural Development Program, a farmer-driven research and education program that collaborates with Cornell University and Cooperative Extension on projects that directly affect agriculture in the state's six northernmost counties: Clinton, Essex, Franklin, Jefferson, Lewis and St. Lawrence.

Six fact sheets on phosphorus research in New York State are found online at www.nnyagdev.org. For more information on the Northern New York Agricultural Development Program, go to www.nnyagdev.org or call program co-chairs Joe Giroux at 518-563-7523 or Jon Greenwood at 315-386-3231 or program coordinator R. David Smith at 607-255-7286.

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Story reported in the September 28, 2005 issues of the Watertown Journal and Republican on the Lewis County Ag-Business Days rain simulator demonstration and seminars.

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Agriculture

Lewis County Farmers Get NNY P Index Update

At the recent Lewis County Agri-Business Field Days in Lowville, Jason Kahabka, an extension associate with Cornell University's Department of Crop and Soil Sciences, shared information about efforts to evaluate and improve New York's phosphorus management guidelines. Working on regional farms and research stations, researchers hope to identify the strengths and weaknesses of the current system for rating farm fields for their risk of contributing phosphorus to surface waters where it could contribute to eutrophication.

Beginning in 1999, federal standards required New York to develop a phosphorus index that now shapes the way farmers apply fertilizers and manure.

"Most farmers are interested to know how the P Index will affect their nutrient management planning and their manure application decisions," Mr. Kahabka said. "Currently, the P Index is the best option we have to help farmers assess their risk for nutrient runoff based on their individual farm circumstances. The research team involved in developing the P Index for New York State has worked hard to balance environmental protection needs with agricultural needs," he said.

"Through a continuum of projects — in the lab, on farms and at research stations — we are able improve our understanding of P dynamics, and that knowledge helps farmers adapt to the guidelines with flexibility for their manure management needs," Kahabka said.

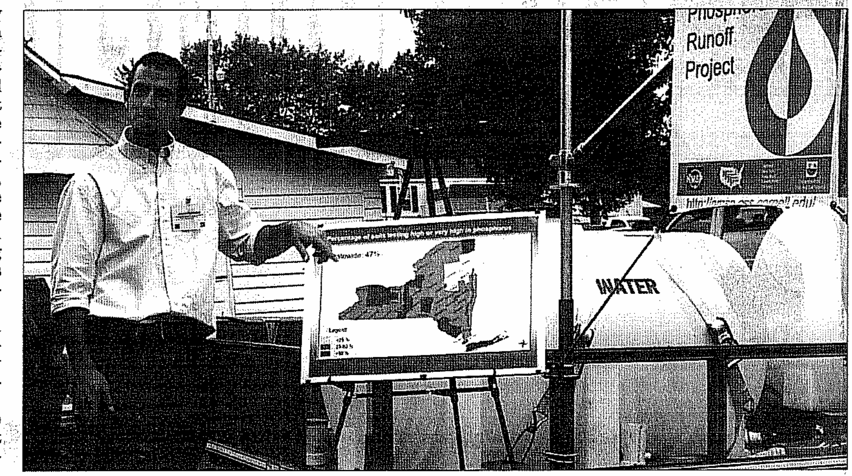

Photo submitted by Kara Lynn Dunn

At the Lewis County Agribusiness Days, Jason Kahabka of Cornell University's New York Phosphorus Runoff Project points out that 47% of the soils tested statewide from 1995-2001 measured high or very high in phosphorus. As a region, Northern New York shows a steady increase in phosphorus accumulation.

Data from Northern New York suggests that soil P levels have been steadily increasing over the last 40 years, and that increase has accelerated over the past 10-20 years. Research to date has shown that once phosphorus reaches high levels in the soil, the yield response of a corn crop flattens out and it does not pay to add additional phosphorus in fertilizer or manure to that crop. It is also known that at levels above the critical agronomic point for crops the loss of phosphorus into surface water can increase rapidly.

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