Rao, R., B. Tillapaugh, Q.M. Ketterings, and H. Krol (2007). Wyoming Soil Sample Survey (2002-2006). CSS Extension Bulletin E07-22. 35 pages.

Soil Sample Survey

Wyoming County

Samples analyzed by CNAL (2002-2006)

Wyoming County (photo credit: Bruce Tillapaugh, CCE of Wyoming County).

Summary compiled by

Renuka Rao, Bruce Tillapaugh, Quirine M. Ketterings, Hettie Krol

Cornell Nutrient Analysis Laboratory

http://www.css.cornell.edu/soiltest/newindex.asp

&

Nutrient Management Spear Program

http://nmsp.css.cornell.edu/

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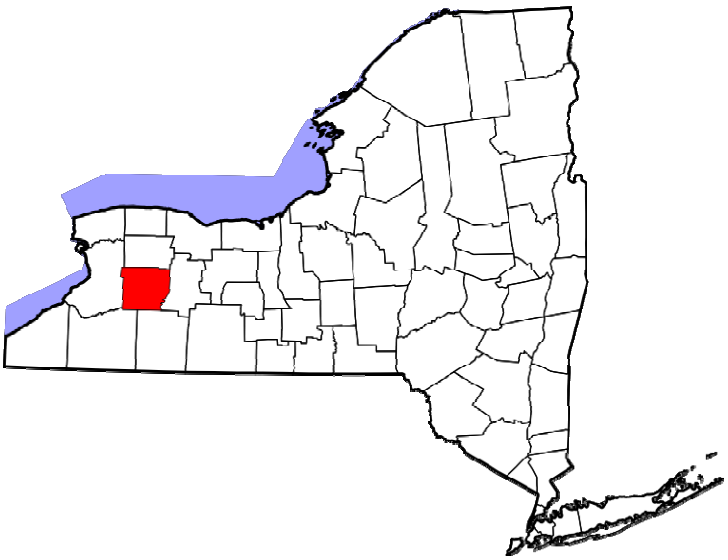
Wyoming County (photo credit: Bruce Tillapaugh, CCE of Wyoming County).

1. County Introduction

Wyoming County in western New York has a large agricultural industry. Crops grown includes, among others, forage grasses and legumes, corn for grain and silage, winter and spring cereal grains, and soybeans. Vegetables grown in the county include processing vegetables such as field peas, snap beans, beets and potatoes and sweet corn, road side market vegetables including peas, sweet corn, broccoli, cabbage, beans, squashes, onions, tomatoes, melons and pumpkins. Strawberries, blue berries, and many varieties of apples are grown in the county and there are many acres of conifers for landscape and Christmas tree sale as well.



The Cornell Nutrient Management Analysis Laboratory (CNAL) at Cornell University has a long track record in soil testing. Commercial producers and home owners who have their soils tested for available nutrients will receive up-to-date crop fertility recommendations based on decades of fertility research with local relevance. In an era of enhanced environmental regulations and agricultural environmental management, CNAL continues to play a key role in New York. For optimum economic and environmental management of crops, the amount of fertilizer nutrients and agriculture lime applied to a particular field should be based upon a complete soil analysis and knowledge about the field and its management history. Past crop production practices often influence current year fertility needs, especially when manure is used as the fertilizer source. Manure is an asset that can have a positive impact on farm crop fertility production management strategies, if applied at the right time, in the right amount and with the right method.

Soil resources influence everyone, from farm producer to consumer. The soils in Wyoming County, New York, range from glacial till soils to soils formed in glacial

outwash, Kame deposits and old alluvial fan deposits, glacial lake sediment, and contrasting glacial deposits. Conesus-Lansing Association soils are glacial till soils that are deep, well-drained and moderately well drained medium lime soils which have medium-textured subsoil found on the upland portions of the county. Other examples of glacial till soils that can be found in the uplands of Wyoming County are soils belonging to the: Nunda–Danley Association (deep, moderately well drained, medium lime soils with moderately fine textured subsoil), Darien–Ilion Association (deep, somewhat poorly drained and poorly drained medium lime soils with moderately fine textured subsoil), Erie–Langford Association (typically deep, somewhat poorly drained, moderately well drained and well drained, low lime soils that have a medium textured subsoil), Bath–Mardin Association (deep, well drained, and moderately well drained very low lime soils that have medium textured subsoil), Volusia–Mardin Association (deep somewhat poorly drained and moderately well drained very fine low lime soils which have medium textured subsoil), Fremont–Marilla–Hornell Association (deep to moderately deep somewhat poorly drained and moderately well drained, very low lime soils that have a medium textured to fine textured shaly subsoil), Fremont–Marilla Association (deep, somewhat poorly drained and moderately well drained very low lime soils that have a moderately fine textured and medium textured subsoil), Manlius–Lordstown Association (moderately deep, well drained to excessively well-drained very low lime soils that have a medium textured subsoil), and the Lordstown–Tuller Association (moderately deep to shallow, well drained to poorly drained, very low lime soils that possess medium textured subsoil).

Examples of soils formed in glacial outwash, Kame deposits or old alluvial fan deposits include soils from the Chenango–Howard–Castile Association (deep, somewhat excessively well drained to moderately well drained, very low to medium lime soils that have a medium textured and moderately coarse textured very gravelly to gravelly subsoil), the Howard–Chenango Association (deep, well drained and somewhat excessively drained, medium lime and very low lime soils that have a medium textured and moderately coarse textured very gravelly subsoil), the Herkimer–Wayland–Wallkill Association (deep, well drained to very poorly drained, medium lime to high lime soils that have a medium textured and moderately fine textured subsoil on glacial outwash fans and flood plains), and the Halsey–Palms–Papakating Associations (deep, very poor to poorly drained medium lime soils that have a moderately coarse textured to moderately fine textured mineral subsoil or an organic layer on outwash terraces and flood plains).

Soils from the Caneadea Association are deep, somewhat poorly drained to moderately well drained, medium to high lime soils which have a moderately fine textured to fine textured subsoil formed on glacial lake deposits. Soils formed in contrasting glacial deposits include soils from the Bath–Valois Association (deep, well drained, low lime soils that have a medium textured with moderately coarse textured subsoil on moranic upland), Howard–Madrid Association (deep, well drained and somewhat excessively well drained, medium lime soils with medium textured and moderately coarse textured subsoil that is very gravelly in some locations), and the Varysburg–Williamson–Churchville Association (deep, well drained to somewhat poorly drained, very low lime soils that have a medium to fine textured subsoil on valley-side deposits).

The soil resources of Wyoming County have played an important role in the success of the agricultural industry in the county. Soil testing aids in determining the current fertility status of a field as expressed in percent organic matter, pH, and extractable phosphorus, potassium, magnesium, calcium, and micronutrients. Through decades of soil fertility research conducted by Cornell University faculty and staff, in collaboration with Cornell Cooperative Extension Educators and producers, soil test data can be used to determine the likeliness of a response to additional nutrients (either inorganic fertilizer of organic nutrient sources) for optimum economic and environmentally sound production of crops.

As you review this document, consider the soil types (and their characteristics) of your farm or garden. Depending on your test results, application of additional supplemental nutrients may or may not be needed.

Bruce P. Tillapaugh
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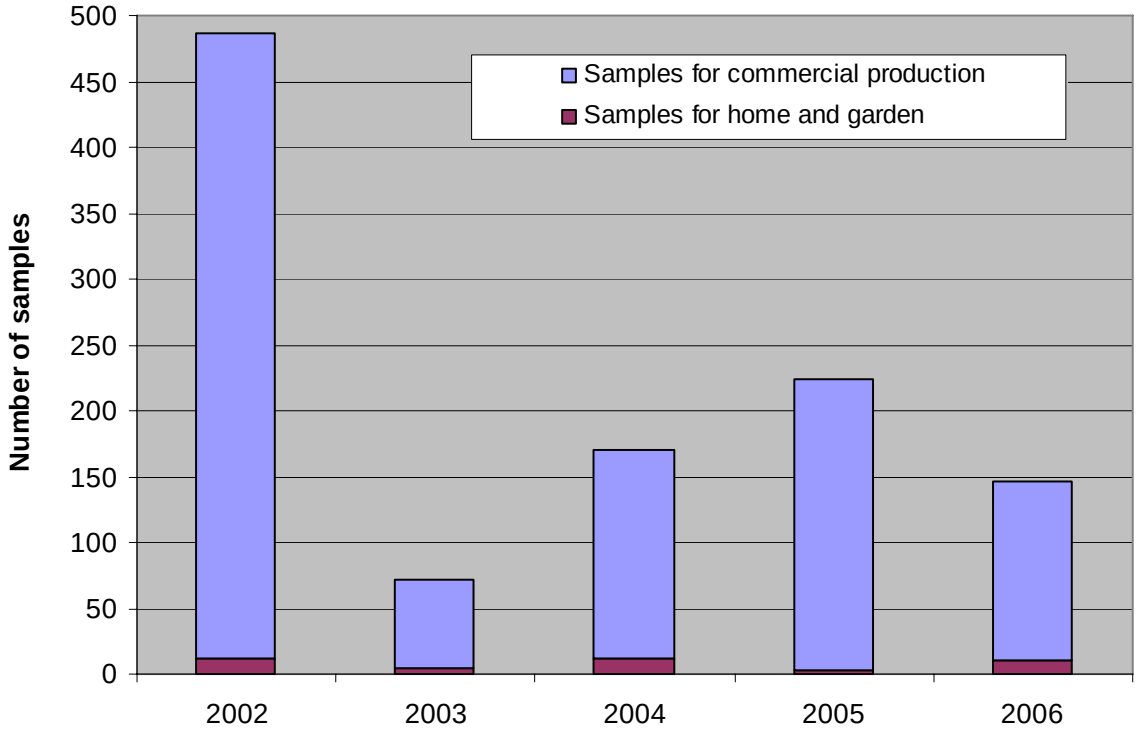
2. General Survey Summary

This survey summarizes the soil test results from grower (identified as "commercial samples") and homeowner samples from Wyoming County submitted to the Cornell Nutrient Analysis Laboratory (CNAL) from 2002 to 2006. The total number of samples analyzed in these years amounted to 1097. Of these, 1056 samples (96%) were submitted by commercial growers while 41 samples (4%) were submitted by homeowners.



Homeowners			Commercial			Total
2002	12		2002	474		486
2003	4		2003	67		71
2004	12		2004	158		170
2005	3		2005	221		224
2006	10		2006	136		146
Total	41		Total	1056		1097

Homeowners submitted soil samples to the Cornell Nutrient Analysis Laboratory during 2002-2006 primarily to request fertilizer recommendations for home garden vegetable production (32%), for lawns (29%), athletic fields (12%) or ornamentals (10%). Commercial growers submitted samples to grow corn silage or grain (35%), alfalfa or alfalfa/grass mixes 18%), dry and snap beans (11%), potatoes and sweet corn (6% each).

Soils tested for home and garden in Wyoming County were classified as belonging to soil management group 2 (12%), 3 (54%), or 4 (34%). A description of the different management groups is given below.

Soil Management Groups for New York

1	Fine-textured soils developed from clayey lake sediments and medium- to fine-textured soils developed from lake sediments.
2	Medium- to fine-textured soils developed from calcareous glacial till and medium-textured to moderately fine-textured soils developed from slightly calcareous glacial till mixed with shale and medium-textured soils developed in recent alluvium.
3	Moderately coarse textured soil developed from glacial outwash and recent alluvium and medium-textured acid soil developed on glacial till.
4	Coarse- to medium-textured soils formed from glacial till or glacial outwash.
5	Coarse- to very coarse-textured soils formed from gravelly or sandy glacial outwash or glacial lake beach ridges or deltas.
6	Organic or muck soils with more than 80% organic matter.

Of the samples submitted by commercial growers, 1 sample was a group 1 soil. Twenty-nine percent belonged to soil management group 2, 66% were group 3 soils, 5% were group 4 soils and the remainder was of unknown origin. Bath was the most common soil series (13% of all samples), followed by Conesus (11%), Erie (10%), Chenango (10%) and Langford (7%).

Organic matter levels, as measured by loss-on-ignition, ranged from less than 2% to 25%. For homeowners, 52% had between 3 and 5% organic matter, 15% testing between 5 and 6% organic matter and 27% were classified as soils with more than 6% organic matter. Of

the samples submitted by commercial growers, 68% contained between 3 and 5% organic matter.

Soil pH in water (1:1 soil:water extraction ratio) varied from 4.5 to 7.9 for home and garden samples while 61% tested between 6.0 and 7.4 for pH and 24% were between pH 7 and 8. For the commercial samples, the highest pH was 8.1 and 64% tested between 6.0 and 7.

Extractable nutrients such as phosphorus (P), potassium (K), magnesium (Mg), calcium (Ca), iron (Fe), manganese (Mn), and zinc (Zn) were measured using the Morgan method (Morgan, 1941). This solution contains sodium acetate buffered at pH of 4.8.

Soil test P levels of <1 lb P/acre are classified as very low. Between 1-3 lbs P/acre is low. Medium is between 4-8 lbs P/acre. High testing soils have P levels between 9 and 39 lbs P/acre and anything higher is classified as very high. For homeowners, 10% of the soils tested low for P, 15% tested medium, 29% tested high and 46% tested very high. This meant that 76% tested high or very high in P. For commercial growers, 7% tested very high. In total 23% were low in P, 22% tested medium for P while 48% of the submitted samples were classified as high in soil test P. This means that 54% tested high or very high in P.

Classifications for K depend on soil management group. The fine textured soils (soil management group 1) have a greater K supplying capacity than the coarse textured sandy soils (soil management group 5). Classification for each of the management groups in the above table represent very low, low, medium, high and very high. So for example for soil management group 5 and 6, <60 lbs K/acre means the soil is very low in K, between 60 and 114 lbs K/acre is medium, 115-164 lbs K/acre is medium, 165-269 lbs K/acre is high and >269 lbs K/acre is classified as very high (see Table on page 6).

Potassium classifications for Wyoming County soils varied from very low (two of the commercial growers' soils) to very high (78% of the homeowner soils and 48% of the commercial growers' soils). For homeowners, 2% tested low in K, 18% tested medium, and 10% tested high for potassium. For commercial growers' soils, 5% tested low, 16% tested medium and 30% tested high in K.

Soil Management Group	Potassium Soil Test Value (Morgan extraction in lbs K/acre)				
	Very low	Low	Medium	High	Very High
1	<35	35-64	65-94	95-149	>149
2	<40	40-69	70-99	100-164	>164
3	<45	45-79	80-119	120-199	>199
4	<55	55-99	100-149	150-239	>239
5 and 6	<60	60-114	115-164	165-269	>269

Soils test very low for Mg if Morgan extractable Mg is less than 20 lbs Mg/acre. Low testing soils have 20-65 lbs Morgan Mg per acre. Soils with 66-100 lbs Mg/acre test medium for Mg. High testing soils have 101-199 lbs Mg/acre while soils with more than 200 lbs Mg/acre in the Morgan extraction are classified as very high in Mg. Magnesium levels ranged from 31 to almost 7000 lbs Mg/acre. There were no samples that tested very low for Mg. Most soils tested very high for Mg (95% of the homeowner soils and 88% of the soils of the commercial growers). In total, only two homeowner soils and 9 of the commercial growers' soil tested low or medium in Mg.

Soils with more than 50 lbs Morgan extractable Fe per acre test excessive for Fe. Anything lower than 50 lbs Fe/acre is considered normal. Iron levels ranged from 93-96% in the normal range with 7% of the homeowner soils and 4% of the commercial grower soils testing excessive for Fe. Similarly, most soils (93-99%) tested normal for manganese. Soils with more than 100 lbs Morgan extractable Mn per acre are classified as excessive in Mn. Anything less than 100 lbs Mn per acre is classified as normal. Soils with less than 0.5 lb Zn per acre in the Morgan extraction are classified as low in Zn. Medium testing soils have between 0.5 and 1 lb of Morgan extractable Zn per acre. If more than 1 lb of Zn/acre is extracted with the Morgan solution, the soil tests high in Zn. For the homeowner soils, 98% tested high for Zn while 2% tested medium. Of the commercial growers' samples, 2% tested low, 20% tested medium while 78% were high in Zn.

In the following sections, the summary tables for each of the soil fertility indicators described above are given. The appendix contains the crop codes used in section 3.

3. Cropping Systems

3.1 Homeowner Samples

Crops for which recommendations were requested by homeowners:

	2002-2006	%
APR	1	2
ATF	5	12
BLB	1	2
BLU	1	2
LAW	12	29
MVG	13	32
PER	2	5
ROS	1	2
SAG	4	10
TRF	1	2
Total	41	100

Note: See Appendix for Cornell crop codes.

Wyoming County (photo credit: Bruce Tillapaugh, CCE of Wyoming County).

3.2 Commercial Samples

Crops for which recommendations were requested in commercial samples:

Current year crop	2002	2003	2004	2005	2006	Total	%
ABE/ABT	1	3	1	2	0	7	1
AGE/AGT	90	9	15	21	3	138	13
ALE/ALT	9	5	3	25	4	46	4
APP	2	0	0	3	1	6	1
BCE	4	0	0	0	0	4	0
BDR	1	0	0	0	0	1	0
BET	1	0	0	0	0	1	0
BGE/BGT	1	0	0	0	2	3	0
BLB	0	1	0	0	0	1	0
BND	3	0	7	5	4	19	2
BNS	29	12	8	24	20	93	9
BSP	0	0	0	1	0	1	0
BSS	0	0	0	1	0	1	0
CGE/CGT	15	0	5	12	6	38	4
CLE	1	2	1	0	0	4	0
COG/COS	218	11	61	55	27	372	35
GIE/GIT	1	0	1	1	24	27	3
GRE/GRT	8	3	8	3	1	23	2
IDL	0	1	2	0	0	3	0
MIL	0	0	0	0	4	4	0
MIX	0	0	0	0	1	1	0
MML	0	1	0	0	0	1	0
MVG	0	0	0	1	0	1	0
OAS	0	3	0	0	9	12	1
OAT	0	1	0	0	0	1	0
OTH	0	2	2	0	1	5	0
PEA	31	1	8	15	0	55	5
PGE/PGT	8	8	1	1	0	18	2
PIE/PIT	4	0	1	0	5	10	1
PLT	0	0	1	0	0	1	0
PNT	1	0	2	0	0	3	0
POT	18	3	22	7	12	62	6
SAG	1	0	0	0	0	1	0
SOY	1	0	1	0	0	2	0
STE	0	0	0	1	0	1	0

Current year crop	2002	2003	2004	2005	2006	Total	%
STS	0	0	2	0	0	2	0
SWC	9	1	6	40	10	66	6
TOM	0	0	0	1	2	3	0
WHS	4	0	0	2	0	6	1
WHT	8	0	0	0	0	8	1
Unknown	5	0	0	0	0	5	0
Total	474	67	158	221	136	1056	100

Note: See Appendix for Cornell crop codes.

Wyoming County (photo credit: Bruce Tillapaugh, CCE of Wyoming County).

4. Soil Types

4.1 Homeowner Samples

Soil types (soil management groups) for homeowner samples:

	2002-2006	%
SMG 1 (clayey)	0	0
SMG 2 (silty)	5	12
SMG 3 (silt loam)	22	54
SMG 4 (sandy loam)	14	34
SMG 5 (sandy)	0	0
SMG 6 (mucky)	0	0
Total	41	100

Wyoming County (photo credit: Bruce Tillapaugh, CCE of Wyoming County).

4.2 Commercial Samples

Soil series for commercial samples:

Name	SMG	2002	2003	2004	2005	2006	Total	%
Allard	3	7	1	2	2	1	13	1
Angola	2	0	0	0	0	2	2	0
Appleton	2	16	1	1	14	4	36	3
Arkport	4	6	1	0	0	0	7	1
Arnot	3	0	0	0	0	1	1	0
Aurora	2	8	0	0	0	0	8	1
Bath	3	65	6	31	26	8	136	13
Blasdell	3	8	0	0	0	0	8	1
Burdett	2	3	1	0	1	2	7	1
Canadice	2	0	0	0	0	3	3	0
Canaseraga	3	0	8	7	10	2	27	3
Caneadea	2	2	0	0	0	0	2	0
Castile	4	9	0	3	12	4	28	3
Chenango	3	54	1	17	24	5	101	10
Chippewa	3	3	0	1	0	1	5	0
Collamer	3	3	0	1	1	0	5	0
Conesus	2	53	2	13	30	14	112	11
Dalton	3	7	0	6	4	0	17	2
Danley	2	6	0	0	5	0	11	1
Darien	2	0	0	0	4	2	6	1
Erie	3	28	6	21	13	39	107	10
Fremont	2	2	1	0	1	0	4	0
Genesee	2	3	0	0	1	0	4	0
Halsey	4	1	0	0	0	0	1	0
Hamlin	2	2	2	1	0	1	6	1
Herkimer	3	7	1	3	5	18	34	3
Holderton	3	4	0	0	0	0	4	0
Homer	2	2	2	4	0	0	8	1
Honeoye	2	4	0	0	0	0	4	0
Howard	3	39	5	6	6	1	57	5
Kendaia	2	0	0	3	0	0	3	0
Langford	3	24	14	10	17	14	79	7
Lansing	2	24	3	0	12	2	41	4
Lima	2	4	0	6	0	0	10	1
Lordstown	3	2	2	0	1	0	5	0
Lyons	2	2	0	0	0	0	2	0

Name	SMG	2002	2003	2004	2005	2006	Total	%
Madalin	1	1	0	0	0	0	1	0
Madrid	4	0	0	1	0	1	2	0
Mardin	3	18	1	14	10	2	45	4
Middlebury	3	1	0	0	0	0	1	0
Nunda	2	1	0	1	13	1	16	2
Odessa	2	1	0	0	0	0	1	0
Olean	2	1	0	0	0	0	1	0
Palmyra	3	9	4	0	1	0	14	1
Phelps	3	6	0	0	0	0	6	1
Red Hook	4	3	0	0	1	0	4	0
Rhinebeck	2	3	0	0	0	0	3	0
Scio	3	4	2	2	1	0	9	1
Sun	4	0	0	1	0	0	1	0
Teel	2	2	0	0	1	3	6	1
Tioga	3	6	0	0	0	0	6	1
Varysburg	2	7	0	0	0	0	7	1
Venango	3	0	0	1	0	0	1	0
Volusia	3	6	0	1	5	2	14	1
Wayland	2	1	0	0	0	0	1	0
Williamson	4	3	1	1	0	0	5	0
Unknown	-	3	2	0	0	3	8	1
Total	-	474	67	158	221	136	1056	100

5. Organic Matter

5.1 Homeowner Samples

Organic matter (loss-on-ignition method) in homeowner samples (number):

	<1	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	>6.9	Total
Number	0	1	2	13	8	6	5	6	41
Percentage	0	2	5	32	20	15	12	15	100

	2002-2006
Lowest:	1.8
Highest:	24.6
Mean:	5.7
Median:	4.4

Wyoming County (photo credit: Bruce Tillapaugh, CCE of Wyoming County).

5.2 Commercial Samples

Organic matter (loss-on-ignition method) in commercial samples (number):

	<1	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	>6.9	Total
2002	0	18	73	180	150	42	8	3	474
2003	0	5	17	20	11	8	4	2	67
2004	0	1	15	60	53	21	7	1	158
2005	0	0	38	94	72	14	1	2	221
2006	0	1	31	36	45	17	5	1	136
Total	0	25	174	390	331	102	25	9	1056

	2002	2003	2004	2005	2006
Lowest:	1.3	1.6	1.6	2.0	1.7
Highest:	7.5	8.9	7.0	22.8	7.2
Mean:	3.8	3.8	4.1	3.9	3.9
Median:	3.7	3.4	4.0	3.7	4.0

Organic matter in commercial samples (% of total number of samples):

	<1	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	>6.9	Total
2002	0	4	15	38	32	9	2	1	100
2003	0	7	25	30	16	12	6	3	100
2004	0	1	9	38	34	13	4	1	100
2005	0	0	17	43	33	6	0	1	100
2006	0	1	23	26	33	13	4	1	100
Total	0	2	16	37	31	10	2	1	100

6. pH

6.1 Homeowner Samples

pH of homeowner samples (numbers):

	<4.5	4.5-4.9	5.0-5.4	5.5-5.9	6.0-6.4	6.5-6.9	7.0-7.4	7.5-7.9	8.0-8.4	>8.4	Total
Number	0	1	1	4	6	7	12	10	0	0	41
Percentage	0	2	2	10	15	17	29	24	0	0	100

	2002-2006
Lowest:	4.5
Highest:	7.9
Mean:	-
Median:	7.0

6.2 Commercial Samples

pH of commercial samples (number):

	<4.5	4.5-4.9	5.0-5.4	5.5-5.9	6.0-6.4	6.5-6.9	7.0-7.4	7.5-7.9	8.0-8.4	>8.4	Total
2002	0	2	13	77	135	159	73	12	3	0	474
2003	0	0	2	12	24	20	7	2	0	0	67
2004	0	0	9	34	53	42	16	4	0	0	158
2005	0	0	9	33	88	67	23	1	0	0	221
2006	1	0	6	37	54	31	7	0	0	0	136
Total	1	2	39	193	354	319	126	19	3	0	1056

	2002	2003	2004	2005	2006
Lowest:	4.7	5.1	5.2	5.1	4.2
Highest:	8.1	7.6	7.7	7.8	7.3
Mean:	-	-	-	-	-
Median:	6.5	6.3	6.3	6.4	6.1

pH of commercial samples (% of total number of samples):

	<4.5	4.5-4.9	5.0-5.4	5.5-5.9	6.0-6.4	6.5-6.9	7.0-7.4	7.5-7.9	8.0-8.4	>8.4	Total
2002	0	0	3	16	28	34	15	3	1	0	100
2003	0	0	3	18	36	30	10	3	0	0	100
2004	0	0	6	22	34	27	10	3	0	0	100
2005	0	0	4	15	40	30	10	0	0	0	100
2006	1	0	4	27	40	23	5	0	0	0	100
Total	0	0	4	18	34	30	12	2	0	0	100

7. Phosphorus

7.1 Homeowner Samples

Phosphorus (lbs/acre Morgan P) in homeowner samples (numbers):

	<1	1-3	4-8	9-39	40-60	61-80	81-100	101-150	151-200	>200	Total
	VL	L	M	H	VH	VH	VH	VH	VH	VH	
Number	0	4	6	12	3	2	4	4	0	6	41
Percentage	0	10	15	29	7	5	10	10	0	15	100

VL = very low, L = low, M = medium, H = high, VH = very high.

	2002-2006
Lowest:	1
Highest:	687
Mean:	98
Median:	38

7.2 Commercial Samples

Phosphorus (lbs P/acre Morgan extraction) for commercial samples (number):

	<1	1-3	4-8	9-39	40-60	61-80	81-100	101-150	151-200	>200	Total
	VL	L	M	H	VH	VH	VH	VH	VH	VH	
2002	0	121	95	227	21	6	1	1	1	1	474
2003	0	20	16	24	1	0	0	1	2	3	67
2004	0	26	42	80	6	1	1	2	0	0	158
2005	0	35	53	117	16	0	0	0	0	0	221
2006	0	42	31	57	4	1	1	0	0	0	136
Total	0	244	237	505	48	8	3	4	3	4	1056

VL = very low, L = low, M = medium, H = high, VH = very high.

	2002	2003	2004	2005	2006
Lowest:	1	1	1	1	1
Highest:	360	335	124	59	87
Mean:	16	28	17	15	12
Median:	10	6	11	11	7

Phosphorus in commercial samples (% of total number of samples):

	<1	1-3	4-8	9-39	40-60	61-80	81-100	101-150	151-200	>200	Total
	VL	L	M	H	VH	VH	VH	VH	VH	VH	
2002	0	26	20	48	4	1	0	0	0	0	100
2003	0	30	24	36	1	0	0	1	3	4	100
2004	0	16	27	51	4	1	1	1	0	0	100
2005	0	16	24	53	7	0	0	0	0	0	100
2006	0	31	23	42	3	1	1	0	0	0	100
Total	0	23	22	48	5	1	0	0	0	0	100

VL = very low, L = low, M = medium, H = high, VH = very high.

8. Potassium

8.1 Homeowner Samples

Potassium (lbs K/acre Morgan extraction) in homeowner samples (number):

Soil Management Group 1						
	<35	35-64	65-94	95-149	>149	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	0	0	0	0	0	0
Total (%)	-	-	-	-	-	-
Soil Management Group 2						
	<40	40-69	70-99	100-164	>164	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	0	0	0	0	5	5
Total (%)	0	0	0	0	100	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	0	0	2	2	18	22
Total (%)	0	0	9	9	82	100
Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	0	1	2	2	9	14
Total (%)	0	7	14	14	64	100
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	0	0	0	0	0	0
Total (%)	-	-	-	-	-	-
Soil Management Group 6						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	0	0	0	0	0	0
Total (%)	-	-	-	-	-	-

Potassium classification summary for homeowners:

	Very Low	Low	Medium	High	Very High	Total
Number	0	1	4	4	32	41
Percentage	0	2	10	10	78	100

	2002-2006
Lowest:	88
Highest:	18471
Mean:	758
Median:	273

Wyoming County (photo credit: Bruce Tillapaugh, CCE of Wyoming County).

8.2 Commercial Samples

Potassium (lbs K/acre Morgan extraction) in commercial samples (number):

Soil Management Group 1						
	<35	35-64	65-94	95-149	>149	Total
	Very Low	Low	Medium	High	Very High	
2002	0	0	0	0	1	1
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
Total (#)	0	0	0	0	1	1
Total (%)	0	0	0	0	100	100
Soil Management Group 2						
	<40	40-69	70-99	100-164	>164	Total
	Very Low	Low	Medium	High	Very High	
2002	0	7	32	53	55	147
2003	0	1	3	4	4	12
2004	0	0	1	10	18	29
2005	0	0	7	35	40	82
2006	0	0	4	7	23	34
Total (#)	0	8	47	109	140	304
Total (%)	0	3	15	36	46	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
2002	1	19	55	73	153	301
2003	0	3	9	18	21	51
2004	0	4	17	35	67	123
2005	0	8	21	25	72	126
2006	0	6	15	43	30	94
Total (#)	1	40	117	194	343	695
Total (%)	0	6	17	28	49	100

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
2002	1	5	4	6	6	22
2003	0	1	1	0	0	2
2004	0	0	2	0	4	6
2005	0	0	0	2	11	13
2006	0	0	0	4	1	5
Total (#)	1	6	7	12	22	48
Total (%)	2	13	15	25	46	100
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
Total (#)	0	0	0	0	0	0
Total (%)	-	-	-	-	-	-
Soil Management Group 6						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
Total (#)	0	0	0	0	0	0
Total (%)	-	-	-	-	-	-

Potassium classification summary for commercial samples.

Summary (#)	Very Low	Low	Medium	High	Very High	Un-known	Total
2002	2	31	91	132	215	3	474
2003	0	5	13	22	25	2	67
2004	0	4	20	45	89	0	158
2005	0	8	28	62	123	0	221
2006	0	6	19	54	54	3	136
Grand Total	2	54	171	315	506	8	1056

Summary (%)	Very Low	Low	Medium	High	Very High	Un-known	Total
2002	0	7	19	28	45	1	100
2003	0	7	19	33	37	3	100
2004	0	3	13	28	56	0	100
2005	0	4	13	28	56	0	100
2006	0	4	14	40	40	2	100
Grand Total	0	5	16	30	48	1	100

	2002	2003	2004	2005	2006
Lowest:	36	43	73	59	55
Highest:	3585	1654	1602	17824	653
Mean:	221	216	248	323	207
Median:	169	141	213	193	171

9. Magnesium

9.1 Homeowner Samples

Magnesium (lbs Mg/acre Morgan extraction) in homeowner samples (numbers):

	<20	20-65	66-100	101-199	>199	Total
	Very Low	Low	Medium	High	Very High	
Number	0	1	1	0	39	41
Percentage	0	2	2	0	95	100

	2002-2006
Lowest:	50
Highest:	2185
Mean:	465
Median:	374

9.2 Commercial Samples

Magnesium (lbs Mg/acre Morgan extraction) in commercial samples (number):

	<20	20-65	66-100	101-199	>199	Total
	Very Low	Low	Medium	High	Very High	
2002	0	1	2	51	420	474
2003	0	1	2	13	51	67
2004	0	0	0	21	137	158
2005	0	0	2	25	194	221
2006	0	1	0	10	125	136
Total	0	3	6	120	927	1056

	2002	2003	2004	2005	2006
Lowest:	57	63	122	93	31
Highest:	789	1077	896	6828	762
Mean:	355	323	385	379	356
Median:	348	299	389	353	356

Magnesium in commercial samples (% of total number of samples):

	<20	20-65	66-100	101-199	>199	Total
	Very Low	Low	Medium	High	Very High	
2002	0	0	0	11	89	100
2003	0	1	3	19	76	100
2004	0	0	0	13	87	100
2005	0	0	1	11	88	100
2006	0	1	0	7	92	100
Total	0	0	1	11	88	100

10. Iron

10.1 Homeowner Samples

Iron (lbs Fe/acre Morgan extraction) in homeowner samples:

Total number of samples:

	0-49	>49	Total
	Normal	Excessive	
Total	38	3	41

Percentages:

0-49	>49	Total
Normal	Excessive	
93	7	100

	2002-2006
Lowest:	2
Highest:	506
Mean:	27
Median:	8

10.2 Commercial Samples

Iron (lbs Fe/acre Morgan extraction) in commercial samples:

Total number of samples:

	0-49	>49	Total
	Normal	Excessive	
2002	465	9	474
2003	66	1	67
2004	143	15	158
2005	215	6	221
2006	122	14	136
Total	1011	45	1056

Percentages:

0-49	>49	Total
Normal	Excessive	
98	2	100
99	1	100
91	9	100
97	3	100
90	10	100
96	4	100

	2002	2003	2004	2005	2006
Lowest:	1	2	2	2	2
Highest:	139	125	91	104	117
Mean:	10	16	21	15	23
Median:	6	11	15	10	14

11. Manganese

11.1 Homeowner Samples

Manganese (lbs Mn/acre Morgan extraction) in homeowner samples:

Total number of samples:

	0-99	>99	Total
	Normal	Excessive	
Total	38	3	41

Percentages:

0-99	>99	Total
Normal	Excessive	
93	7	100

	2002-2006
Lowest:	12
Highest:	109
Mean:	47
Median:	41

11.2 Commercial Samples

Manganese (lbs Mn/acre Morgan extraction) in commercial samples:

Total number of samples:

	0-99	>99	Total
	Normal	Excessive	
2002	471	3	474
2003	67	0	67
2004	154	4	158
2005	220	1	221
2006	134	2	136
Total	1046	10	1056

Percentages:

0-99	>99	Total
Normal	Excessive	
99	1	100
100	0	100
97	3	100
100	0	100
99	1	100
99	1	100

	2002	2003	2004	2005	2006
Lowest:	9	12	11	12	14
Highest:	125	67	155	210	106
Mean:	32	30	37	36	38
Median:	29	26	31	33	35

12. Zinc

12.1 Homeowner Samples

Zinc (lbs Zn/acre Morgan extraction) in homeowner samples:

Total number of samples:

	<0.5	0.5-1.0	>1	Total
	Low	Medium	High	
Total	0	1	40	41

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
0	2	98	100

	2002-2006
Lowest:	1.0
Highest:	143.4
Mean:	17.9
Median:	7.5

12.2 Commercial Samples

Zinc (lbs Zn/acre Morgan extraction) in commercial samples:

Total number of samples:

	<0.5	0.5-1.0	>1	Total
	Low	Medium	High	
2002	4	63	407	474
2003	0	9	58	67
2004	3	47	108	158
2005	5	62	154	221
2006	7	31	98	136
Total	19	212	825	1056

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
1	13	86	100
0	13	87	100
2	30	68	100
2	28	70	100
5	23	72	100
2	20	78	100

	2002	2003	2004	2005	2006
Lowest:	0.4	0.8	0.2	0.3	0.1
Highest:	17.3	14.0	15.7	21.4	9.9
Mean:	2.3	2.5	1.9	1.9	1.6
Median:	1.9	1.6	1.4	1.4	1.4

Appendix: Cornell Crop Codes

Crop codes used in the Cornell Nutrient Analysis Laboratory.

Crop Code	Crop Description
	Alfalfa
ABE	Alfalfa trefoil grass, Establishment
ABT	Alfalfa trefoil grass, Established
AGE	Alfalfa grass, Establishment
AGT	Alfalfa grass, Established
ALE	Alfalfa, Establishment
ALT	Alfalfa, Established
	Birdsfoot
BCE	Birdsfoot trefoil clover, Establishment
BCT	Birdsfoot trefoil clover, Established
BGE	Birdsfoot trefoil grass, Establishment
BGT	Birdsfoot trefoil grass, Established
BSE	Birdsfoot trefoil seed, Establishment
BST	Birdsfoot trefoil seed, Established
BTE	Birdsfoot trefoil, Establishment
BTT	Birdsfoot trefoil, Established
	Barley
BSP	Spring barley
BSS	Spring barley with legumes
BUK	Buckwheat
BWI	Winter barley
BWS	Winter barley with legumes
	Clover
CGE	Clover grass, Establishment
CGT	Clover grass, Established
CLE	Clover, Establishment
CLT	Clover, Established
CSE	Clover seed production, Establishment
CST	Clover seed production, Established

Crop Code	Crop Description
	Corn
COG	Corn grain
COS	Corn silage
	Grasses, pastures, covercrops
CVE	Crownvetch, Establishment
CVT	Crownvetch, Established
GIE	Grasses intensively managed, Establishment
GIT	Grasses intensively managed, Established
GRE	Grasses, Establishment
GRT	Grasses, Established
PGE	Pasture, Establishment
PGT	Pasture improved grasses, Established
PIE	Pasture intensively grazed, Establishment
PIT	Pasture intensively grazed, Established
PLE	Pasture with legumes, Establishment
PLT	Pasture with legumes, Established
PNT	Pasture native grasses
RYC	Rye cover crop
RYS	Rye seed production
TRP	Triticale peas
	Small grains
MIL	Millet
OAS	Oats seeded with legume
OAT	Oats
SOF	Sorghum forage
SOG	Sorghum grain
SOY	Soybeans
SSH	Sorghum sudan hybrid
SUD	Sudangrass
WHS	Wheat with legume
WHT	Wheat
	Others
ALG	Azalea
APP	Apples
ATF	Athletic field

Crop Code	Crop Description
BDR/DND	Beans-dry
BLU	Blueberries
CEM	Cemetery
FAR	Fairway
FLA	Flowering annuals
GRA	Grapes
GEN	Green
HRB	Herbs
IDL	Idle land
LAW	Lawn
MIX/MVG	Mixed vegetables
PER	Perennials
PRK	Park
POT/PTO	Potatoes
PUM	Pumpkins
ROD	Roadside
ROS	Roses
RSF	Raspberries, Fall
RSP	Raspberries (homeowners)
RSS	Raspberries, Summer
SAG	Ornamentals adapted to pH 6.0 to 7.5
SQW	Squash, Winter
STE	Strawberries, Ever
STR	Strawberries (homeowners)
STS	Strawberries, Spring
SUN	Sunflowers
SWC	Sweet corn
TOM	Tomatoes
TRE	Christmas trees, Establishment
TRF	Turf
TRT	Christmas trees, Topdressing