Soil Sample Survey

Chemung County

Samples analyzed by CNAL (2002-2006)

Summary compiled by

**Renuka Rao, James Grace, Carl Albers, Mark Watts,
Quirine M. Ketterings, and 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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Table of Content

Rao, R., J. Grace, C. Albers, M. Watts, Q.M. Ketterings, and H. Krol (2007). Chemung Soil Sample Survey (2002-2006). CSS Extension Bulletin E07-7. 32 pages.

1. County Introduction

Chemung County is primarily an urban county in central New York located along New York's border with Pennsylvania. Agriculture is comprised of dairy and livestock farms, with a few vegetable farms – 70% of the land area is woodland. The latest Census of Agriculture has over four hundred farms listed for the county, with small or part-time farms comprising the majority of the farms in the county.
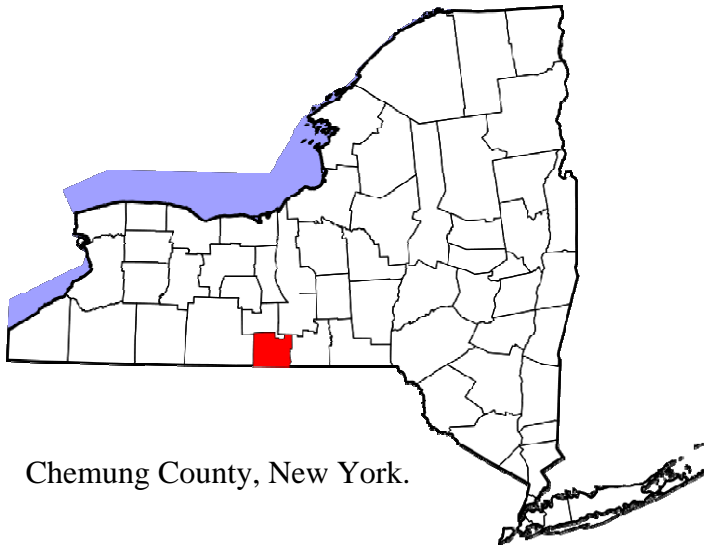
Chemung County, New York.

The county's frost-free period is from mid-May to mid-September. Crops that are grown include corn for silage and grain, hay and oats. The Chemung River flows though the county and is part of the Chesapeake Bay watershed – the remainder of the county flows into the Seneca Lake watershed. The county's soils are predominately clay based with the Volusia and Mardin series the largest acreage; however, there is also a good deal of well-drained valley soil. A good share of these valley soils are very productive and used for dairy and crop production. Dairy farms are located in the eastern and north central portions of the county. The urban areas are also located in the river valley and compete for land with agriculture – unfortunately, this competition for well-drained, valley land has become intense in recent years.

Due to the urban pressure, land prices have increased and all farmers have non-farm neighbors. Land that was removed from agriculture has been purchased by those that desire a hobby or part-time farm and therefore returned the land to production. Many of these farms raise horses or beef cattle. Others have purchased acreage in the country and rent it to farmers. On some farms, this is a major portion of the land they crop.

Commercial farm numbers have been declining. However, the remaining farms are growing larger. At present there are 25 commercial dairy farms in Chemung County – several of them milk over hundred cows. Commercial agriculture will continue in Chemung County for the foreseeable future, but most of the growth will be in part-time farms, particularly horse, livestock and alternative crop enterprises such as greenhouse, nursery and vegetable crops to meet the needs of the growing urban population.

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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 Chemung County submitted to the Cornell Nutrient Analysis Laboratory (CNAL) during 2002 and 2006. The total number of samples analyzed in these years amounted to 204. Of these 136 samples (67%) were submitted by commercial growers while 68 samples (33%) were submitted by homeowners.
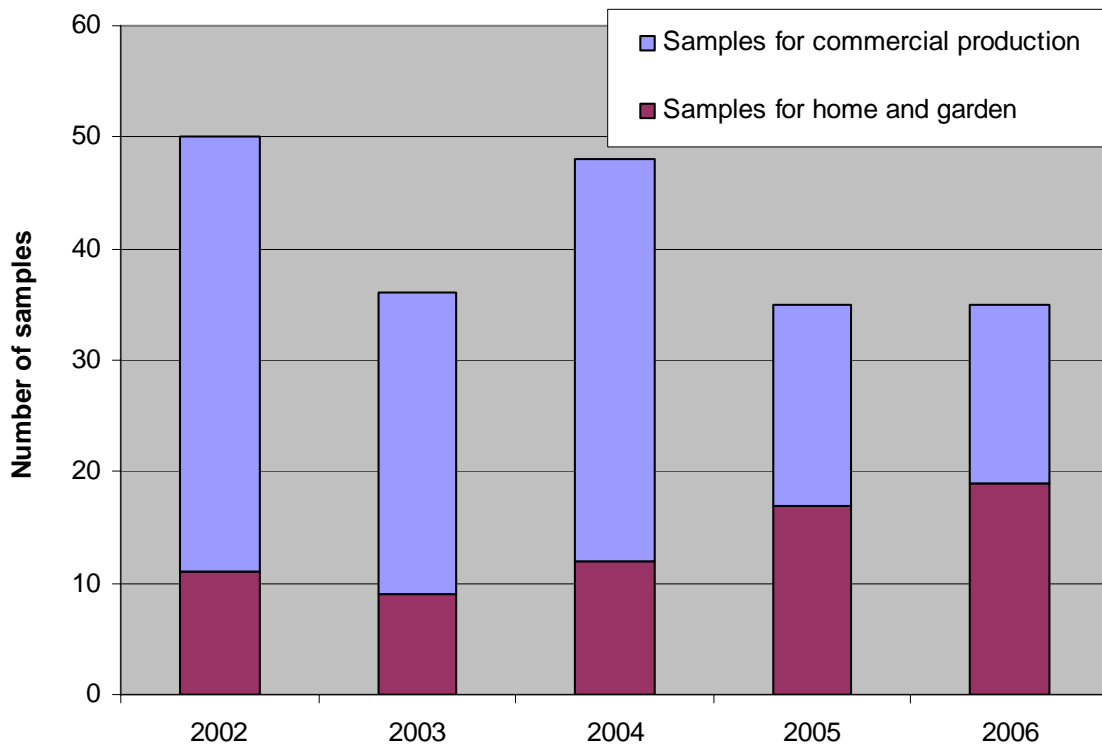
Homeowners		Commercial		Total
2002	11	2002	39	50
2003	9	2003	27	36
2004	12	2004	36	48
2005	17	2005	18	35
2006	19	2006	16	35
Total	68	Total	136	204

3

Homeowners that submitted soil samples to the Cornell Nutrient Analysis Laboratory during 2002-2006 requested fertilizer recommendations for lawns (24%), home garden vegetable production (25%), perennials and ornamentals (22%) or other plants. Commercial growers submitted samples to grow pasture (18%), clover mixes (13%), vegetables (12%), alfalfa or alfalfa/grass mixes (11%), corn silage or grain (11%), and grass hay production (10%) while a few growers were planning to grow sweet corn and other crops.

Soils tested for home and garden in Chemung County were classified as belonging to soil management group 2 (22%), group 3 (32%), group 4 (34%), or group 5 (12%). A description of the different management groups is given below. Of the samples submitted by commercial growers, all but one belonged to soil management group 3. Volusia was the most common soil series (32% of all samples), followed by Howard (16%), Chenango, Mardin and Lordstown (9% each).

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.

Organic matter levels, as measured by loss-on-ignition, ranged from less than 1% to over 20%. For homeowners 50% of the samples had between 2 and 5% organic matter, 53%

4

tested between 3 and 6% in organic matter while 22% were classified as soils with more than 6.9% organic matter. Of the samples submitted by commercial growers, 67% contained between 3 and 6% organic matter.

Soil pH in water (1:1 soil:water extraction ratio) varied from 4.3 to 7.8 for home and garden samples while 74% tested between 6.0 and 7.4 for pH. For the commercial samples, the highest pH was 7.4. Fifty two percent tested between pH 6.0 and 7.4 while 29% were between pH 5.5 and 5.9.

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 a 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, 7% tested low for phosphorus, 10% tested medium, 34% tested high and 49% tested very high. This meant that 82% tested high or very high in P. For commercial growers, only 9% tested very high. In total 44% were low in P, 16% tested medium for P while 31% of the samples were classified as high in soil test P. This means that 40% of the commercial grower samples tested high or very high in P.

Classifications for potassium 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 below).

Potassium classifications for Chemung County soils varied from very low (1% of the commercial growers' soils) to very high (76% of the homeowner soils and 40% of the commercial growers' soils). For homeowners, 3% tested low in K, 12% tested medium, and 9% tested high for potassium. For commercial growers' soils, 7% tested low, 22% tested medium and 30% tested high in potassium.

5

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 magnesium 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 magnesium. 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 20 to almost 6000 lbs Mg/acre (Morgan extraction). There were no soils that tested very low for Mg. Most soils tested very high for Mg (96% of the homeowner soils and 88% of the soils of the commercial growers). In total 1% of the homeowner soils and 4% of the commercial growers' samples 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 fell for 82-91% in the normal range with only 9% of the homeowner soils and 18% of the commercial grower soils testing excessive for Fe. Similarly, most soils (90%) 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, 100% tested high. Of the commercial growers' samples, 7% tested low, 12% tested medium while 81% was 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	%
CEM	1	1
FLA	1	1
GEN	6	9
IDL	1	1
LAW	16	24
MVG	17	25
OTH	8	12
PER	6	9
ROS	1	1
RSP	1	1
SAG	9	13
Unknown	1	1
Total	68	100

Notes: See Appendix for Cornell crop codes.

3.2 Commercial Samples

Crops for which recommendations were requested in commercial samples:

Current year crop	2002	2003	2004	2005	2006	Total	%
ABE/ABT	2	1	1	0	0	4	3
AGE/AGT	1	3	0	0	2	6	4
ALE/ALT	0	5	0	0	0	5	4
APP	0	2	0	0	0	2	1
BCE/T	7	0	0	3	0	10	7
BGE/T	1	0	1	0	0	2	1
BLB	0	1	0	0	0	1	1
BUK	0	0	1	0	0	1	1
CGE/CGT	0	0	1	2	2	5	4
CLE/CLT	2	0	8	2	0	12	9
COG/COS	4	3	0	6	2	15	11
GIE/GIT	0	1	0	1	0	2	1
GRE/GRT	2	4	3	0	3	12	9
MIX	2	4	7	1	2	16	12
OTH	0	0	2	0	0	2	1
PEA	0	0	1	0	0	1	1
PGE/PGT	0	1	0	0	0	1	1
PIE/PIT	5	0	0	1	5	11	8
PLE/PLT	1	0	7	1	0	9	7
PNT	2	0	0	1	0	3	2
STE	0	1	0	0	0	1	1
SWC	9	1	0	0	0	10	7
TOM	1	0	0	0	0	1	1
Unknown	0	0	4	0	0	4	3
Total	39	27	36	18	16	136	100

Notes: See Appendix for Cornell crop codes.

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)	15	22
SMG 3 (silt loam)	22	32
SMG 4 (sandy loam)	23	34
SMG 5 (sandy)	8	12
SMG 6 (mucky)	0	0
Total	68	100

4.2 Commercial Samples

Soil series for commercial samples:

Name	SMG	2002	2003	2004	2005	2006	Total	%
Alluvial	3	0	1	1	1	0	3	2
Arnot	3	0	0	4	1	1	6	4
Castile	4	0	0	1	0	0	1	1
Chenango	3	4	5	1	1	1	12	9
Howard	3	13	5	2	1	1	22	16
Lordstown	3	1	2	4	1	4	12	9
Mardin	3	2	4	2	3	1	12	9
Middlebury	3	0	4	2	1	4	11	8
Tioga	3	1	1	2	0	0	4	3
Tuller	3	0	0	0	2	0	2	1
Unadilla	3	0	1	5	0	1	7	5
Volusia	3	18	4	12	7	3	44	32
Total	-	39	27	36	18	16	136	100

5. Organic Matter

5.1 Homeowner Samples

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

Total	<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
#	1	3	8	15	11	10	5	15	68
%	1	4	12	22	16	15	7	22	100

	2002-2006
Lowest:	0.6
Highest:	23.2
Mean:	5.4
Median:	4.5

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	3	4	12	9	6	3	2	39
2003	0	0	7	4	6	9	0	1	27
2004	0	2	5	5	10	6	4	4	36
2005	0	0	0	2	6	5	2	3	18
2006	0	0	3	7	1	2	1	2	16
Total	0	5	19	30	32	28	10	12	136

	2002	2003	2004	2005	2006
Lowest:	1.1	2.1	1.7	3.3	2.4
Highest:	9.4	7.2	16.1	8.9	15.7
Mean:	4.3	4.2	5.0	5.4	5.1
Median:	4.0	4.7	4.5	5.2	3.3

Organic matter 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	8	10	31	23	15	8	5	100
2003	0	0	26	15	22	33	0	4	100
2004	0	6	14	14	28	17	11	11	100
2005	0	0	0	11	33	28	11	17	100
2006	0	0	19	44	6	13	6	13	100
Total	0	4	14	22	24	21	7	9	100

6. pH

6.1 Homeowner Samples

pH of homeowner samples:

Total	<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
#	2	0	5	8	16	14	20	3	0	0	68
%	3	0	7	12	24	21	29	4	0	0	100

	2002-2006
Lowest:	4.3
Highest:	7.8
Mean:	-
Median:	6.6

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	1	0	7	9	9	11	2	0	0	0	0	39
2003	0	0	5	7	10	4	0	0	0	0	1	27
2004	0	2	6	14	7	3	3	1	0	0	0	36
2005	0	0	0	5	4	8	1	0	0	0	0	18
2006	0	0	3	4	3	3	3	0	0	0	0	16
Total	1	2	21	39	33	29	9	1	0	0	1	136

	2002	2003	2004	2005	2006
Lowest:	4.4	5.0	4.9	5.6	5.2
Highest:	7.1	6.8	7.5	7.1	7.4
Mean:	-	-	-	-	-
Median:	6.0	6.0	5.8	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	3	0	18	23	23	28	5	0	0	0	0	100
2003	0	0	19	26	37	25	0	0	0	0	4	100
2004	0	6	17	39	19	8	8	3	0	0	0	100
2005	0	0	0	28	22	36	6	0	0	0	0	100
2006	0	0	19	25	19	12	19	0	0	0	0	100
Total	1	1	15	29	24	21	7	1	0	0	1	100

7. Phosphorus

7.1 Homeowner Samples

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

Total	<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	
#	0	5	7	23	11	4	0	6	2	10	68
%	0	7	10	34	16	6	0	9	3	15	100

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

	2002-2006
Lowest:	1
Highest:	613
Mean:	104
Median:	35

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	16	8	12	3	0	0	0	0	0	39
2003	0	14	2	10	1	0	0	0	0	0	27
2004	0	17	6	9	0	1	1	0	0	2	36
2005	0	8	2	7	1	0	0	0	0	0	18
2006	0	5	4	4	0	1	0	0	0	2	16
Total	0	60	22	42	5	2	1	0	0	4	136

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

	2002	2003	2004	2005	2006
Lowest:	1	1	1	1	1
Highest:	50	41	638	50	787
Mean:	12	10	45	12	106
Median:	6	3	4	5	6

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	41	21	31	8	0	0	0	0	0	100
2003	0	52	7	37	4	0	0	0	0	0	100
2004	0	47	17	25	0	3	3	0	0	6	100
2005	0	44	11	39	6	0	0	0	0	0	100
2006	0	31	25	25	0	6	0	0	0	13	100
Total	0	44	16	31	4	1	1	0	0	3	100

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

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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	1	3	11	15
Total (%)	0	0	7	20	73	100
Soil Management Group 5						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	0	0	4	1	17	22
Total (%)	0	0	18	5	77	100
Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	0	2	3	1	17	23
Total (%)	0	9	13	4	74	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	1	7	8
Total (%)	0	0	0	13	88	100
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 (%)	-	-	-	-	-	-

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Potassium classification summary for homeowners:

Summary (#)	Very Low	Low	Medium	High	Very High	Total
Total (#)	0	2	8	6	52	68
Total (%)	0	3	12	9	76	100

	2002-2006
Lowest:	60
Highest:	1901
Mean:	375
Median:	268

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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	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 2					
	<40	40-69	70-99	100-164	>164	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 3					
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
2002	2	1	10	13	13	39
2003	0	2	6	7	12	27
2004	0	3	5	13	14	35
2005	0	1	5	4	8	18
2006	0	2	3	4	7	16
Total (#)	2	9	29	41	54	135
Total (%)	1	7	21	30	40	100

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Soil Management Group 4					
<55	55-99	100-149	150-239	>239	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	1	0	0	1
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
Total (#)	0	0	1	0	0	1
Total (%)	0	0	100	0	0	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 (%)	-	-	-	-	-	-

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Potassium classification summary for commercial samples.

Summary (#)	Very Low	Low	Medium	High	Very High	Total
2002	2	1	10	13	13	39
2003	0	2	6	7	12	27
2004	0	3	6	13	14	36
2005	0	1	5	4	8	18
2006	0	2	3	4	7	16
Grand Total	2	9	30	41	54	136

Summary (%)	Very Low	Low	Medium	High	Very High	Total
2002	5	3	26	33	33	100
2003	0	7	22	26	44	100
2004	0	8	17	36	39	100
2005	0	6	28	22	44	100
2006	0	13	19	25	44	100
Grand Total	1	7	22	30	40	100

	2002	2003	2004	2005	2006
Lowest:	34	78	62	62	70
Highest:	654	505	3118	495	3315
Mean:	191	226	309	205	421
Median:	159	161	160	157	159

Rao, R., J. Grace, C. Albers, M. Watts, Q.M. Ketterings, and H. Krol (2007). Chemung Soil Sample Survey (2002-2006). CSS Extension Bulletin E07-7. 32 pages.

9. Magnesium

9.1 Homeowner Samples

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

	<20	20-65	66-100	101-199	>199	Total
	Very Low	Low	Medium	High	Very High	
Total #	0	1	0	2	65	68
Total %	0	1	0	3	96	100

	2002-2006
Lowest:	20
Highest:	1577
Mean:	517
Median:	441

22

Rao, R., J. Grace, C. Albers, M. Watts, Q.M. Ketterings, and H. Krol (2007). Chemung Soil Sample Survey (2002-2006). CSS Extension Bulletin E07-7. 32 pages.

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	0	1	4	34	39
2003	0	0	0	3	24	27
2004	0	1	3	1	31	36
2005	0	0	0	1	17	18
2006	0	0	0	3	13	16
Total	0	1	4	12	119	136

	2002	2003	2004	2005	2006
Lowest:	100	133	49	182	152
Highest:	745	824	3789	1112	5977
Mean:	366	409	513	666	914
Median:	329	400	399	627	413

Magnesium 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	3	10	87	100
2003	0	0	0	11	89	100
2004	0	3	8	3	86	100
2005	0	0	0	6	94	100
2006	0	0	0	19	81	100
Total	0	1	3	9	88	100

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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	62	6	68

Percentages:

0-49	>49	Total
Normal	Excessive	
91	9	100

	2002-2006
Lowest:	1
Highest:	220
Mean:	18
Median:	7

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10.2 Commercial Samples

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

Total number of samples:

	0-49	>49	Total
	Normal	Excessive	
2002	28	11	39
2003	24	3	27
2004	30	6	36
2005	16	2	18
2006	14	2	16
Total	112	24	136

Percentages:

	0-49	>49	Total
	Normal	Excessive	
2002	72	28	100
2003	89	11	100
2004	83	17	100
2005	89	11	100
2006	88	13	100
Total	82	18	100

	2002	2003	2004	2005	2006
Lowest:	1	1	6	3	2
Highest:	141	64	363	72	104
Mean:	29	18	42	20	23
Median:	9	13	32	10	11

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11. Manganese

11.1 Homeowner Samples

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

Total number of samples: Percentages:

	0-99	>99	Total		0-99	>99	Total
	Normal	Excessive			Normal	Excessive	
Total	61	7	68		90	10	100

	2002-2006
Lowest:	17
Highest:	254
Mean:	58
Median:	45

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11.2 Commercial Samples

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

Total number of samples:

	0-99	>99	Total
	Normal	Excessive	
2002	34	5	39
2003	26	1	27
2004	30	6	36
2005	18	0	18
2006	14	2	16
Total	122	14	136

Percentages:

	0-99	>99	Total
	Normal	Excessive	
87	13	100
96	4	100
83	17	100
100	0	100
88	13	100
90	10	100

	2002	2003	2004	2005	2006
Lowest:	9	11	23	13	19
Highest:	195	138	165	95	172
Mean:	55	42	59	46	54
Median:	45	35	50	41	41

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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	0	68	68

Percentages:

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

	2002-2006
Lowest:	1.1
Highest:	370.2
Mean:	18.8
Median:	5.2

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	1	2	36	39
2003	1	3	23	27
2004	0	6	30	36
2005	1	2	15	18
2006	7	3	6	16
Total	10	16	110	136

Percentages:

	<0.5	0.5-1.0	>1	Total
	Low	Medium	High	
2002	3	5	92	100
2003	4	11	85	100
2004	0	17	83	100
2005	6	11	83	100
2006	44	19	38	100
Total	7	12	81	100

	2002	2003	2004	2005	2006
Lowest:	0.4	0.4	0.5	0.1	0.1
Highest:	43.5	6.4	82.6	4.1	83.6
Mean:	7.3	2.7	5.3	2.1	9.1
Median:	3.9	2.3	1.7	1.9	0.7

Rao, R., J. Grace, C. Albers, M. Watts, Q.M. Ketterings, and H. Krol (2007). Chemung Soil Sample Survey (2002-2006). CSS Extension Bulletin E07-7. 32 pages.

Appendix: Cornell Crop Codes

Crop codes are used in the Cornell Nutrient Analyses 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 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

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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, Established
TRF	Turf
TRT	Christmas trees, Topdressing