

Rao, R., A. Deming, Q.M. Ketterings, and H. Krol (2007). Essex Soil Sample Survey 2002-2006. CSS Extension Bulletin E07-6. 33 pages.

Soil Sample Survey

Essex County

Samples analyzed by CNAL (2002-2006)



Essex County (photo credit: Anita Deming, CCE of Essex County).

Summary compiled by

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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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Essex County (photo credit: Anita Deming, CCE of Essex County).

1. County Introduction

Essex County has a long agricultural history. The county has farms that have been productive since the French built Fort St. Frederic in Crown Point in 1734. The land is rural and will stay rural as the county is entirely within the protected Adirondack Park. History and scenic beauty meet in the Adirondacks. The county includes the fertile Champlain Valley, and several river valleys with a backdrop of beauty unrivaled in the Northeast. Farms in the country tend to be small, independent operations with a wide range of products.

The soils in Essex County are extremely diverse with lake-laid clays, stream terraces and bottom land alluvial deposits in the Champlain Valley; high lime calcareous glacial till in the river valleys; glacial outwash as you move upland toward the Adirondack Mountains, and alluvial plain soils in the river valleys.

The topography ranges from 100 feet above sea level in the Champlain Valley to the top of Mount Marcy at 5,344 feet above sea level. The USDA hardiness zones for the county are 4a and 4b ranging from -20°F to -30°F. In the primary agricultural areas the average date of last frost is May 20 and first frost is September 30, giving a 140 day freeze-free season and 2100 growing degree days (base 50°F). The average May to September rainfall is 16 inches.

The agricultural industry is characterized by diversity; diverse wholesale agriculture includes: dairy, apples, potatoes, and organic grains. The county supports a wide variety of direct market farms that sell to a strong tourist industry seeking high-quality unusual products sold through local restaurants and stores.

The county has three Cornell University agricultural research stations with focus on field crops, potatoes, and maple production. A regional Cornell Cooperative Extension fruit specialist offers specialized programming for apples, small fruit and grapes. Champlain Valley Milling, an organic grain mill, is located in Westport. Strong agricultural support services surround the county in Addison County VT, and Clinton and Washington Counties in NY. Adirondack Harvest promotes our products throughout the region and beyond. We have 54,000 acres in NYS approved agricultural districts. You can easily reach NYC, Boston, or Montreal with a 5 hour or less trip by Interstate.

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The Adirondacks see over 10 million visitors a year, and residents support local food options. The image of Essex County is one of a pure, wholesome environment that produces quality products inside the Adirondack Park. For more information on opportunities Essex County check our web sites <http://counties.cce.cornell.edu/essex/> and <http://www.adirondackharvest.com>.



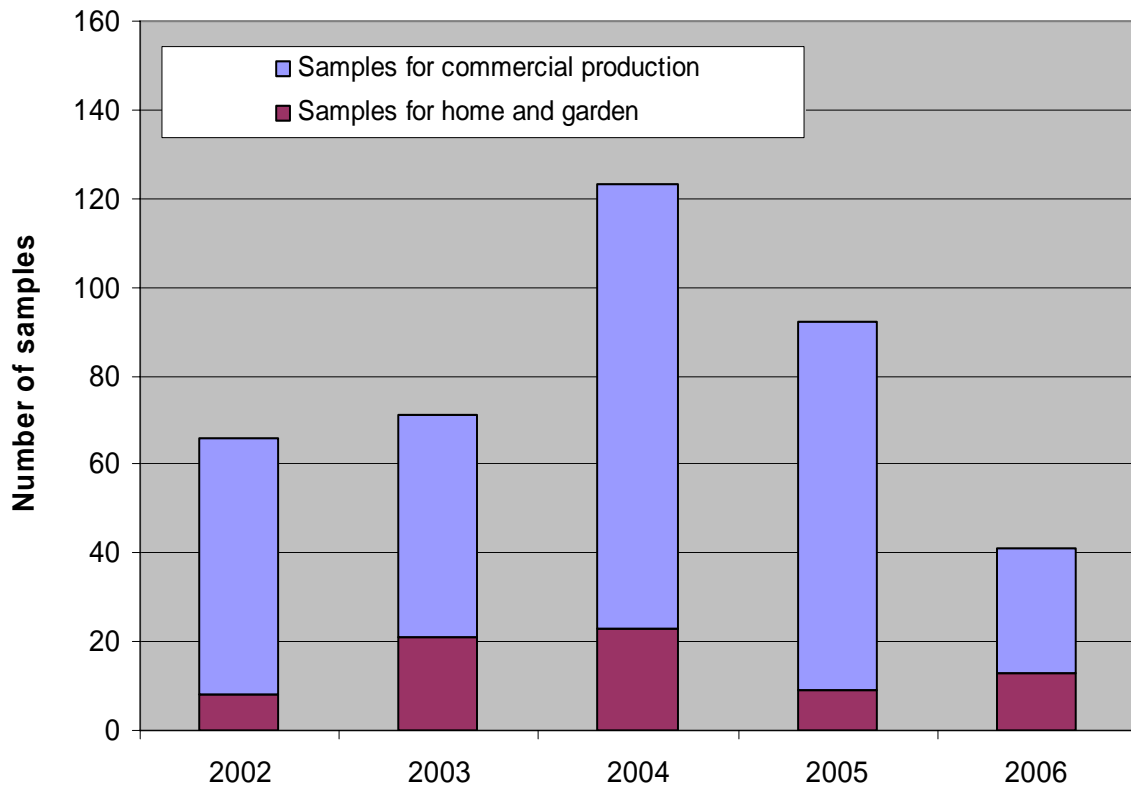
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Essex County (photo credit: Anita Deming, CCE of Essex County).

2. General Survey Summary

This survey summarizes the soil test results from grower (identified as “commercial samples”) and homeowner samples from Essex County submitted to the Cornell Nutrient Analysis Laboratory (CNAL) during 2002 and 2006. The total number of samples analyzed in these years amounted to 393. Of these 319 (81%) were submitted by commercial growers while 74 (19%) were submitted by homeowners.



Homeowners		Commercial		Total
2002	8	2002	58	66
2003	21	2003	50	71
2004	23	2004	100	123
2005	9	2005	83	92
<u>2006</u>	<u>13</u>	<u>2006</u>	<u>28</u>	<u>41</u>
Total	74	Total	319	393

Of the homeowner samples submitted to the Cornell Nutrient Analysis Laboratory during 2002-2006, 27% came from vegetable gardens while 18% were from lawns. Commercial growers submitted samples to grow alfalfa or alfalfa/grass mixes (25%), grass (19%), corn silage or grain (18%), while others requested recommendations for other crops such as clover, pastures or small grains.

Of the soils tested for home and garden in Essex County 45% belonged to soil management group 5. None of the samples belonged to group 1 or 6. Twenty three percent belonged to group 2, 11% to group 3, and 22% to group 4. 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, 50% belonged to soil management group 1. Less than one percent belonged to group 6. Eight percent belonged to soil management group 2, 4% to group 3, 24% to group 4, and 18% to group 5. Vergennes was the most common soil series (38% of all samples), followed by Kingsbury (9%), Becket (6%), and Waumbeck, Planfield and Cayuga (4% each).

Organic matter levels, as measured by loss-on-ignition, ranged from less than 1% to 10%. For homeowners 69% had between 2 and 5% organic matter with 46% testing between 3 and 6%, and 12% with more than 6.9% organic matter. Of the samples submitted by commercial growers, 79% had between 2.0 and 5.0% organic matter while 67% had 3 to 6% organic matter and 3% had 6.9% or greater organic matter levels.

Soil pH in water (1:1 soil:water extraction ratio) varied from 5.0 to 8.0 for home and garden samples while 71% tested between 6.0 and 7.4 for pH and 11% was between 5.5 and 5.9. For the commercial samples, the highest pH was 8.1, 70% tested between 6.0 and 7.4, and 21% was between 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, 35% tested low for phosphorus, 16% tested medium, 31% tested high and 18% were very high. This meant that 49% tested high or very high in P. For commercial growers, only 5% tested very high. In total 56% were low in P, 21% tested medium for P while 18% of the submitted samples were classified as high in soil test P. This means that 24% 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 (group 5). Classifications for soil test results are shown in the table on page 6. 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. Potassium classifications for Essex County soils varied from very low (20% of the homeowner soils and 8% of the commercial growers' soils) to very high (32% of the homeowner soils and 29% of the commercial growers' soils). For homeowners, 18% tested low in K, 15% tested medium, and 15% tested high for potassium. For commercial growers' soils, 16% tested low, 13% tested medium and 33% tested high in potassium.

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 22 to over 2000 lbs Mg/acre (Morgan extraction). There were no soils that tested very low for Mg. Most soils tested very high or very high for Mg (86% of the homeowner soils and commercial grower soils). In total 14% of the homeowner soils and 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 fell for 88-94% in the normal range with 12% of the homeowner soils and 6% of the commercial grower soils testing excessive for Fe. All but two soil samples 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, 81% tested high while 15% tested medium and 4% were low in Zn. Of the commercial growers' samples, 7% tested low in Zn, 28% tested medium while 65% 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 are requested by homeowners:

	2002-2006	%
ALG	1	1
ATF	10	14
FAR	1	1
GRA	9	12
HRB	1	1
LAW	13	18
MIX	2	3
MVG	20	27
OTH	6	8
PER	3	4
ROU	2	3
RSP	1	1
SAG	1	1
SOD	1	1
TRF	2	3
Unknown	1	1
Total	74	100

Notes: See Appendix for Cornell crop codes.

3.2 Commercial Samples

Crops for which recommendations are requested in commercial samples:

Current year crop	2002	2003	2004	2005	2006	Total	%
AGE/AGT	10	8	29	26	6	79	25
ALE/ALT	1	0	0	0	0	1	0
APP	0	0	0	0	2	2	1
BGE	0	0	1	0	0	1	0
BLB	0	0	2	0	0	2	1
BND	0	0	0	1	0	1	0
CGE/CGT	9	0	5	2	0	16	5
CLE	0	0	0	1	1	2	1
COG/COS	0	14	19	20	3	56	18
GPV	1	0	0	0	0	1	0
GRE/GRT	7	16	15	16	7	61	19
IDL	0	1	1	0	2	4	1
MVG	2	0	0	0	0	2	1
MIX	0	1	7	0	0	8	3
OAS	0	0	0	1	0	1	0
ONS	0	0	1	0	0	1	0
OTH	1	1	11	0	0	13	4
PGE/PGT	3	5	0	0	1	9	3
PIE/PIT	0	0	0	7	0	7	2
PNT	0	1	0	0	3	4	1
POT	3	0	0	0	0	3	1
PUM	0	0	2	0	2	4	1
RSS	0	2	1	0	0	3	1
RYS	0	0	0	1	0	1	0
SOY	1	0	0	1	0	2	1
STS	0	0	3	0	0	3	1
SWC	0	0	0	1	0	1	0
TUR	0	0	0	0	1	1	0
WHS	0	0	0	1	0	1	0
WHT	3	1	3	4	0	11	3
Unknown	17	0	0	1	0	18	6
Total	58	50	100	83	28	319	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)	17	23
SMG 3 (silt loam)	8	11
SMG 4 (sandy loam)	16	22
SMG 5 (sandy)	33	45
SMG 6 (mucky)	0	0
Total	74	100

4.2 Commercial Samples

Soil series for commercial samples:

Name	SMG	2002	2003	2004	2005	2006	Total	%
Adams	5	0	0	0	1	3	4	1
Amenia	4	2	3	0	0	0	5	2
Becket	4	17	0	2	0	1	20	6
Berkshire	5	0	0	0	1	0	1	0
Beseman	6	0	0	0	1	0	1	0
Cayuga	2	0	0	0	13	0	13	4
Claverack	4	0	0	3	0	1	4	1
Collamer	3	0	0	5	2	0	7	2
Colton	5	7	0	0	0	0	7	2
Cosad	4	0	0	1	0	0	1	0
Covington	1	0	0	6	0	0	6	2
Croghan	5	0	0	0	0	1	1	0
Deerfield	5	0	0	0	0	1	1	0
Depeyster	3	0	0	0	0	1	1	0
Dunkirk	3	0	0	1	0	0	1	0
Elmwood	4	0	0	1	0	0	1	0
Empeyville	4	0	0	0	0	3	3	1
Hailesbo	3	0	0	0	1	0	1	0
Hartland	4	0	0	0	1	2	3	1
Hermon	4	3	1	2	1	3	10	3
Hogansburg	4	0	0	0	1	0	1	0
Kars	4	0	0	4	0	0	4	1
Kingsbury	1	3	0	13	12	2	30	9
Lovewell	2	0	0	1	0	0	1	0
Naumburg	5	0	0	0	3	0	3	1
Nellis	4	0	2	0	0	0	2	1
Niagara	3	0	1	0	0	0	1	0
Nicholville	4	0	0	2	0	0	2	1
Occum	4	0	1	0	0	0	1	0
Paxton	4	0	0	0	0	2	2	1
Pittsfield	4	0	0	1	0	0	1	0
Plainfield	5	4	0	7	1	0	12	4
Podunk	4	0	0	1	0	0	1	0
Pootatuck	4	0	0	1	1	0	2	1
Raynham	3	0	1	0	0	0	1	0
Rhinebeck	2	0	0	0	10	0	10	3
Rippowam	4	0	0	0	0	1	1	0

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Name	SMG	2002	2003	2004	2005	2006	Total	%
Roundabout	3	0	0	0	1	0	1	0
Skerry	5	0	0	0	1	0	1	0
Sunapee	4	0	0	0	0	1	1	0
Vergennes	1	13	37	40	28	4	122	38
Wareham	5	3	0	0	0	0	3	1
Waumbeck	4	1	2	6	3	0	12	4
Windsor	5	5	0	3	1	2	11	3
Unknown	-	0	2	0	0	0	2	1
Total	-	58	50	100	83	28	319	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
#	1	3	20	17	14	3	7	9	74
%	1	4	27	23	19	4	9	12	100

	2002-2006
Lowest:	0.6
Highest:	10.0
Mean:	4.2
Median:	3.8

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	1	4	17	11	15	8	2	0	58
2003	0	1	9	19	16	3	1	1	50
2004	2	8	20	32	28	5	2	3	100
2005	0	3	12	33	22	9	2	2	83
2006	2	4	6	9	2	2	0	3	28
Total	5	20	64	104	83	27	7	9	319

	2002	2003	2004	2005	2006
Lowest:	0.7	1.6	0.7	1.7	0.1
Highest:	6.9	7.0	7.7	8.4	7.5
Mean:	3.6	3.8	3.6	3.9	3.3
Median:	3.6	3.8	3.6	3.8	3.1

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	2	7	29	19	26	14	3	0	100
2003	0	2	18	38	32	6	2	2	100
2004	2	8	20	32	28	5	2	3	100
2005	0	4	14	40	27	11	2	2	100
2006	7	14	21	32	7	7	0	11	100
Total	2	6	20	33	26	8	2	3	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
#	0	0	6	8	16	16	20	7	1	0	74
%	0	0	8	11	22	22	27	9	1	0	100

	2002-2006
Lowest:	5.0
Highest:	8.0
Mean:	-
Median:	6.7

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	0	4	16	15	16	5	2	0	0	58
2003	0	1	1	5	13	16	9	4	1	0	50
2004	0	0	2	17	39	20	15	6	1	0	100
2005	0	0	4	21	25	25	8	0	0	0	83
2006	0	0	0	9	11	7	1	0	0	0	28
Total	0	1	11	68	103	84	38	12	2	0	319

	2002	2003	2004	2005	2006
Lowest:	5.2	4.9	5.4	5.1	5.6
Highest:	7.8	8.0	8.1	7.4	7.0
Mean:	-	-	-	-	-
Median:	6.3	6.6	6.3	6.4	6.2

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	7	28	26	28	9	3	0	0	100
2003	0	2	2	10	26	32	18	8	2	0	100
2004	0	0	2	17	39	20	15	6	1	0	100
2005	0	0	5	25	30	30	10	0	0	0	100
2006	0	0	0	32	39	25	4	0	0	0	100
Total	0	0	3	21	32	26	12	4	1	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	
#	0	26	12	23	4	1	0	0	3	5	74
%	0	35	16	31	5	1	0	0	4	7	100

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

	2002-2006
Lowest:	1
Highest:	290
Mean:	34
Median:	8

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	40	9	5	1	1	0	1	0	1	58
2003	0	30	10	8	1	0	1	0	0	0	50
2004	0	46	28	20	0	1	1	1	1	2	100
2005	0	41	14	25	1	1	0	0	1	0	83
2006	0	21	5	1	0	0	0	1	0	0	28
Total	0	178	66	59	3	3	2	3	2	3	319

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

	2002	2003	2004	2005	2006
Lowest:	1	1	1	1	1
Highest:	458	81	531	176	105
Mean:	16	8	18	10	7
Median:	2	3	4	4	2

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	69	16	9	2	2	0	2	0	2	100
2003	0	60	20	16	2	0	2	0	0	0	100
2004	0	46	28	20	0	1	1	1	1	2	100
2005	0	49	17	30	1	1	0	0	1	0	100
2006	0	75	18	4	0	0	0	4	0	0	100
Total	0	56	21	18	1	1	1	1	1	1	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	2	3	12	17
Total (%)	0	0	12	18	71	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	1	0	1	1	5	8
Total (%)	13	0	13	13	63	100
Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	2	1	4	5	4	16
Total (%)	13	6	25	31	25	100
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
Total (#)	12	12	4	2	3	33
Total (%)	36	36	12	6	9	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 (%)	-	-	-	-	-	-

Rao, R., A. Deming, Q.M. Ketterings, and H. Krol (2007). Essex Soil Sample Survey 2002-2006. CSS Extension Bulletin E07-6. 33 pages.

Potassium classification summary for homeowners:

Summary (#)	Very Low	Low	Medium	High	Very High	Total
Number	15	13	11	11	24	74
Percentage	20	18	15	15	32	100

	2002-2006
Lowest:	26
Highest:	2059
Mean:	219
Median:	134

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	2	3	6	5	16
2003	0	5	5	18	9	37
2004	0	0	9	28	22	59
2005	0	1	1	4	34	40
2006	0	0	1	2	3	6
Total (#)	0	8	19	58	73	158
Total (%)	0	5	12	37	46	100
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	1	0	1
2005	0	0	0	17	6	23
2006	0	0	0	0	0	0
Total (#)	0	0	0	18	6	24
Total (%)	0	0	0	75	25	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
2002	0	0	0	0	0	0
2003	0	1	0	1	0	2
2004	0	4	1	1	0	6
2005	0	3	1	0	0	4
2006	0	0	0	1	0	1
Total (#)	0	8	2	3	0	13
Total (%)	0	62	15	23	0	100

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
2002	1	5	5	8	4	23
2003	2	4	2	1	0	9
2004	5	9	4	4	2	24
2005	1	2	3	1	0	7
2006	2	6	0	6	0	14
Total (#)	11	26	14	20	6	77
Total (%)	14	34	18	26	8	100
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
2002	9	5	1	2	2	19
2003	0	0	0	0	0	0
2004	1	1	2	1	5	10
2005	3	2	2	1	0	8
2006	2	2	1	2	0	7
Total (#)	15	10	6	6	7	44
Total (%)	34	23	14	14	16	100
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	1	0	0	0	0	1
2006	0	0	0	0	0	0
Total (#)	1	0	0	0	0	1
Total (%)	100	0	0	0	0	100

Potassium classification summary for commercial samples.

Summary (#)	Very Low	Low	Medium	High	Very High	Un-known	Total
2002	10	12	9	16	11	0	58
2003	2	10	7	20	9	2	50
2004	6	14	16	35	29	0	100
2005	5	8	7	23	40	0	83
2006	4	8	2	11	3	0	28
Grand Total	27	52	41	105	92	2	319

Summary (%)	Very Low	Low	Medium	High	Very High	Un-known	Total
2002	17	21	16	28	19	0	100
2003	4	20	14	40	18	4	100
2004	6	14	16	35	29	0	100
2005	6	10	8	28	48	0	100
2006	14	29	7	39	11	0	100
Grand Total	8	16	13	33	29	1	100

	2002	2003	2004	2005	2006
Lowest:	17	39	48	28	48
Highest:	995	386	935	601	245
Mean:	151	123	175	184	132
Median:	116	106	124	158	128

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	8	2	18	46	74
Percentage	0	11	3	24	62	100

	2002-2006
Lowest:	31
Highest:	1519
Mean:	359
Median:	254

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	8	5	4	41	58
2003	0	1	1	5	43	50
2004	0	6	8	6	80	100
2005	0	7	2	7	67	83
2006	0	3	3	6	16	28
Total	0	25	19	28	247	319

	2002	2003	2004	2005	2006
Lowest:	23	43	42	22	24
Highest:	1485	1946	1392	1621	2048
Mean:	543	599	540	746	468
Median:	368	595	542	839	209

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	14	9	7	71	100
2003	0	2	2	10	86	100
2004	0	6	8	6	80	100
2005	0	8	2	8	81	100
2006	0	11	11	21	57	100
Total	0	8	6	9	77	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	65	9	74

Percentages:

0-49	>49	Total
Normal	Excessive	
88	12	100

	2002-2006
Lowest:	1
Highest:	366
Mean:	30
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	53	5	58
2003	49	1	50
2004	96	4	100
2005	74	9	83
2006	28	0	28
Total	300	19	319

Percentages:

0-49	>49	Total
Normal	Excessive	
91	9	100
98	2	100
96	4	100
89	11	100
100	0	100
94	6	100

	2002	2003	2004	2005	2006
Lowest:	1	1	2	2	2
Highest:	77	139	234	103	40
Mean:	16	15	17	21	15
Median:	11	9	11	10	12

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	73	1	74

Percentages:

0-99	>99	Total
Normal	Excessive	
99	1	100

	2002-2006
Lowest:	3
Highest:	106
Mean:	23
Median:	19

11.2 Commercial Samples

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

Total number of samples:				Percentages:		
	0-99	>99	Total	0-99	>99	Total
	Normal	Excessive		Normal	Excessive	
2002	58	0	58	100	0	100
2003	50	0	50	100	0	100
2004	99	1	100	99	1	100
2005	83	0	83	100	0	100
2006	28	0	28	100	0	100
Total	318	1	319	100	0	100

	2002	2003	2004	2005	2006
Lowest:	2	8	5	5	2
Highest:	52	79	255	70	42
Mean:	19	26	24	25	17
Median:	19	25	20	22	15

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	3	11	60	74

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
4	15	81	100

	2002-2006
Lowest:	0.1
Highest:	1073.3
Mean:	56.1
Median:	4.2

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	4	15	39	58
2003	2	21	27	50
2004	4	24	72	100
2005	6	26	51	83
2006	5	4	19	28
Total	21	90	208	319

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
7	26	67	100
4	42	54	100
4	24	72	100
7	31	61	100
18	14	68	100
7	28	65	100

	2002	2003	2004	2005	2006
Lowest:	0.2	0.2	0.1	0.1	0.2
Highest:	8.0	4.5	23.2	4.3	59.9
Mean:	1.9	1.4	2.2	1.4	8.5
Median:	1.3	1.1	1.3	1.2	1.4

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
BDR/DND	Beans-dry

Crop Code	Crop Description
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