

Soil Sample Survey

Cayuga Co.

Samples analyzed by CNAL in 1995-2001



Corn silage harvest in Cayuga County, New York.

Summary compiled by

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Nutrient Management Spear Program: <http://nmsp.css.cornell.edu/>

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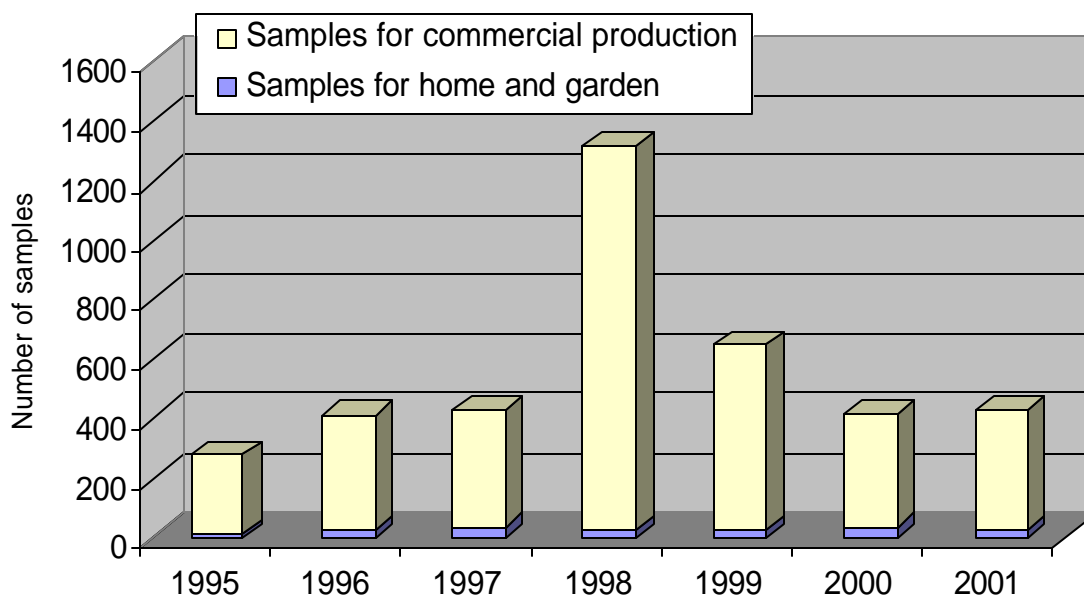
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1. General Survey Summary

This survey summarizes the soil test results from Cayuga County soil samples submitted for analyses to the Cornell Nutrient Analysis Laboratory (CNAL) during 1995-2001. The total number of Cayuga County samples analyzed in these years amounted to 3935. Of these 3756 samples (95%) were submitted to obtain fertilizer recommendations for commercial production while 179 samples (5%) were submitted as home and garden samples.



Home and Garden		Commercial Production		Total
1995	13	1995	268	281
1996	24	1996	387	411
1997	32	1997	396	428
1998	27	1998	1290	1317
1999	26	1999	623	649
2000	33	2000	384	417
<u>2001</u>	<u>24</u>	<u>2001</u>	<u>408</u>	<u>432</u>
Total	179	Total	3756	3935

The majority (67%) of the home and garden soil samples during 1995-2001 was submitted to request fertilizer recommendations for home garden vegetable production (42%) or for lawns (20%). People submitting samples for commercial production requested fertilizer recommendations to grow corn silage or grain (42%), alfalfa or alfalfa/grass mixes (25%) and soybeans (7%), while a few producers were planning on growing other crops including birdsfoot trefoil grass mixes, barley, clover, grapes, oats, peas, grass for pasture, sweet corn, and wheat.

Of the home and garden samples in Cayuga County 34% were classified as sandy loam soils belonging to soil management group 3. Thirty percent belonged to soil management group 2. Group 4 was represented with 28% of all samples and 8% was classified as sandy (soil management group 5). The table below gives descriptions of each of the soil management groups.

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 for commercial production, 79% belonged to soil management group 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 from recent alluvium). Five percent belonged to group 1 (fine-textured soils developed from clayey lake sediments and medium to fine-textured soils developed from lake sediments). Thirteen percent belonged to group 3 (moderately coarse textured soil developed from glacial outwash and recent alluvium and medium-textured acid soil developed on glacial till). Group 4 and 5 were represented by two and less than one percent, respectively. Only a few samples were classified as muck soil (soil management group 6). The five most common soil series were Honeoye (26%), Lima (19%), Lansing (7%), Langford (7%) and Ontario (6%). In Cayuga County Honeoye soils account for 11.9% of the 470,300 acres of the County. Ontario, Langford, Lima, and Lansing soil series account for 11.5%, 8.8%, 8.7%, and 1.9% of the total acreage.

Organic matter levels, as measured by loss on ignition, ranged from less than 1% to 13% with only a few muck soils submitted in 1996 reporting over 40% organic matter. In Cayuga County, the muck soils amount to less than 3% of the total acreage of Cayuga County. Home and garden samples had between 2 and 5% (64% of all samples) with 20% testing between 2 and 2.9% organic matter, 23% between 3.0 and 3.9% and 21% between 4.0 and 4.9% organic matter. Twenty six percent of the soils submitted for home and garden tested higher than 4.9% organic matter. Of the samples submitted for commercial production, 50% contained between 3 and 4% organic matter and 15% tested between 4.0 and 4.9%. In total, 94% of the samples had organic matter levels between 2 and 5%.

Soil pH in water (1:1 extraction ratio) varied from pH 4.8 to 8.1. Of the home and garden samples, 56% tested between pH 6.0 and 7.4 and 36% tested higher than pH 7.4. The median ranged between pH 7.1 and pH 7.4 which is typical for a county dominated by calcareous soils. Sixty eight percent of the samples submitted for commercial production were between pH 6.0 and 7.4 and 23% tested higher than pH 7.4. Only 9% tested lower than pH 6.0.

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

Soil test P levels of <1 lbs 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 than 39 lbs P/acre is classified as very high. Of the home and garden samples, 13% tested low, 14% tested medium, 23% tested high and 48% tested very high. This meant that 71% of the home and garden soils submitted to the Cornell Nutrient Analysis Laboratory tested high or very high in P.

Phosphorus levels for samples for commercial production in Cayuga County were higher than the state average (50% test high or very high in P). Eleven percent tested very high. Fifteen percent were low in P, 27% tested medium for P while 47% of the submitted samples were classified as high in soil test P. This means that 58% tested high or very high in P. There were no clear trends in P levels over the 6 years.

Classifications for potassium depend on soil characteristics and are soil management group specific. The fine-textured soils of 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. Using soil management group 5 and 6 as an example, <60 lbs K/acre means the soil is very low in K, between 60 and 114 lbs K/acre is low, 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 the table below).

Potassium classifications depend on soil test K levels and soil management group.

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

Of the home and garden samples, 4% was very low and 8% was low in potassium. Twelve percent tested medium, 24% high and 51% very high. For samples submitted for commercial production, 5% tested low, 20% medium, 37% high and 37% tested very high in potassium. As with P, there were no trends over the 6 years of soil sampling.

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 less than 20 to over 6000 lbs Mg/acre (Morgan extraction). There were only two samples that tested very low in Mg. Most soils tested very high or very high for Mg (96% of the homeowner soils and 99% of the soils of the commercial growers). No more than 5% of the home and garden soils and 1% of the commercial growers' soil tested low or medium in Mg. Thus, magnesium deficiency is not likely to occur on the high pH soils in Cayuga County.

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 99% in the normal range with 1% of the samples testing excessive for Fe. Similarly, most soils (97-99%) for both groups 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. Zinc levels were much higher. Soils with less than 0.5 lbs of Morgan extractable zinc per acre are classified as low in Zn. Medium testing soils have between 0.5 and 1.0 lbs of Morgan extractable Zn per acre. If more than 1.0 lbs of Zn/acre is extracted with the Morgan solution, the soil tests high in Zn. For the home and garden samples, 77% tested high for zinc while 20% tested medium and 3% tested low for zinc. Of the samples for commercial production, 7% tested low in zinc, 45% tested medium while 47% was high in zinc.

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 2.

Reference

- Morgan, M.F. 1941. Chemical soil diagnosis by the universal soil testing system. Connecticut Agricultural Experimental Station. Bulletin 450.

2. Cropping Systems

2.1 Samples for Home and Garden

Crops for which recommendations are requested by homeowners:

	1995	1996	1997	1998	1999	2000	2001	Total	%
ALG	0	0	0	1	0	0	0	1	1
ATF	0	3	7	0	1	11	0	22	12
BLU	0	0	0	1	0	2	0	3	2
FLA	0	0	0	1	1	1	1	4	2
GEN	0	0	0	0	0	0	1	1	1
GRA	0	0	0	2	0	0	0	2	1
LAW	7	5	10	5	3	5	0	35	20
MIX	0	0	0	0	0	1	0	1	1
MVG	4	12	10	14	14	7	14	75	42
OTH	0	0	0	0	1	3	0	4	2
PER	0	2	2	2	2	0	1	9	5
PRK	0	0	0	0	2	0	0	2	1
ROS	0	0	0	0	0	1	0	1	1
SAG	1	1	2	1	2	2	4	13	7
STR	0	1	0	0	0	0	0	1	1
TRF	1	0	1	0	0	0	0	2	1
Unknown	0	0	0	0	0	0	3	3	2
Total	13	24	32	27	26	33	24	179	100

Notes:

See Appendix for Cornell crop codes.

2.2 Samples for Commercial Production

Crops for which recommendations are requested for commercial production:

Current year crop	1995	1996	1997	1998	1999	2000	2001	Total	%
ABE/ABT	0	0	4	1	2	1	0	8	0
AGE/AGT	50	66	32	340	101	98	69	756	20
ALE/ALT	13	8	43	57	66	4	8	199	5
APP	0	0	0	1	0	0	0	1	0
BCE/BCT	0	0	1	2	0	0	1	4	0
BDR	2	0	1	1	0	8	2	14	0
BGE/BGT	1	13	3	0	15	0	0	32	1
BND	0	5	0	0	2	4	3	14	0
BNS	2	2	1	6	1	0	0	12	0
BSP	3	3	1	6	25	3	0	41	1
BSS	0	1	0	2	0	1	4	8	0
BUK	0	0	0	0	1	5	0	6	0
BWI	0	0	1	0	0	0	0	1	0
CEL	0	1	0	0	0	0	0	1	0
CGE/CGT	3	3	9	2	7	14	0	38	1
CLE/CLT	0	0	1	5	4	0	2	12	0
COS/COG	142	191	175	576	260	143	105	1582	42
GIE/GIT	0	1	2	7	0	4	4	18	0
GPA	0	0	0	1	0	0	0	1	0
GPF	0	0	0	0	0	0	3	3	0
GPV	0	0	0	12	11	0	1	24	1
GRE/GRT	4	12	4	26	10	11	16	83	2
IDL	1	7	0	2	3	1	2	16	0
MIX	4	3	4	7	1	4	0	23	1
OAS	5	5	0	7	9	10	1	37	1
OAT	1	3	0	9	7	2	6	28	1
ONS	0	2	0	0	0	0	0	2	0
OTH	1	0	22	23	6	0	1	53	1
PEA	0	6	4	8	0	2	0	20	1
PGE/PGT	0	2	0	3	7	1	1	14	0
PIE/PIT	1	2	1	5	0	7	1	17	0
PLE/PLT	0	0	6	0	0	3	0	9	0
PNE/PNT	0	10	4	4	9	6	15	48	1
POT	0	0	1	0	1	1	3	6	0
PUM	1	0	1	0	1	1	0	4	0
RSS	0	0	0	0	0	0	2	2	0

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Current year crop	1995	1996	1997	1998	1999	2000	2001	Total	%
RYC	1	0	2	1	0	1	0	5	0
RYS	0	3	0	5	3	3	4	18	0
SOF	0	0	0	1	0	0	0	1	0
SOY	24	17	38	78	37	27	36	257	7
STS	0	0	0	0	1	0	2	3	0
SWC	2	6	4	34	3	0	0	49	1
TME	0	0	0	0	0	0	1	1	0
TOM	1	0	0	0	0	0	0	1	0
TRE/TRT	1	3	1	3	0	1	0	9	0
TRP	0	0	1	0	0	1	0	2	0
TUR	0	0	0	1	0	0	0	1	0
WAT	0	0	0	0	1	0	0	1	0
WHS	1	0	1	11	1	0	0	14	0
WHT	2	9	21	31	22	14	11	110	3
Unknown	2	3	7	12	6	3	114	147	4
Total	268	387	396	1290	623	384	408	3756	100

Notes:

See Appendix for Cornell crop codes.

3. Soil Types

3.1 Samples for Home and Garden

Soil types (soil management groups) for home and garden samples:

	1995	1996	1997	1998	1999	2000	2001	Total
SMG 1 (clayey)	0	0	0	0	0	0	0	0
SMG 2 (silty)	0	11	16	6	5	12	3	53
SMG 3 (silt loam)	9	5	7	6	13	15	5	60
SMG 4 (sandy loam)	2	7	8	11	5	6	12	51
SMG 5 (sandy)	2	1	1	4	3	0	4	15
SMG 6 (mucky)	0	0	0	0	0	0	0	0
Total	13	24	32	27	26	33	24	179

3.2 Samples for Commercial Production

Soil series for samples submitted for commercial production:

SMG	Soil Series	1995	1996	1997	1998	1999	2000	2001	Total
3	Alden	2	0	1	5	2	1	0	11
5	Alton	0	8	0	0	5	3	1	17
2	Angola	0	1	1	3	4	1	2	12
2	Appleton	0	0	1	29	1	4	0	35
4	Arkport	1	5	6	2	0	0	0	14
3	Arnot	0	0	0	0	1	0	0	1
2	Aurora	4	9	3	13	19	8	10	66
4	Benson	1	0	1	7	0	0	2	11
3	Camillus	4	1	0	0	0	0	0	5
2	Cazenovia	4	32	28	51	51	4	20	190
3	Collamer	1	6	2	1	2	4	1	17
5	Colonie	0	1	1	0	0	0	0	2
2	Conesus	17	9	16	53	31	14	10	150
3	Dunkirk	1	0	1	7	0	4	5	18
2	Eel	1	0	0	0	0	0	0	1
3	Erie	0	0	1	0	10	21	4	36
3	Farmington	0	0	0	4	1	0	3	8
4	Fredon	0	0	0	1	0	0	0	1
4	Galen	0	3	1	3	2	1	1	8
2	Genesee	2	2	0	6	2	3	0	15
2	Hilton	1	1	1	7	1	3	0	14
2	Honeoye	48	80	125	406	154	71	100	984
3	Howard	4	0	0	0	0	2	0	6
4	Ira	0	2	0	1	2	2	1	8
2	Kendaia	5	26	11	43	6	7	12	110
1	Lakemont	0	1	0	1	0	0	1	3
4	Lamson	1	1	1	0	0	0	0	3
3	Langford	20	9	4	36	55	93	35	252
2	Lansing	23	19	23	98	66	32	19	280
2	Lima	54	81	91	316	96	53	38	729
1	Madalin	4	4	0	2	1	0	2	13
4	Minoa	0	4	1	0	0	0	0	5
6	Muck	0	3	0	0	0	0	0	3
3	Niagara	1	4	0	1	3	1	0	10
2	Odessa	1	7	6	49	3	4	2	72
2	Ontario	50	11	25	58	46	11	13	214

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SMG	Soil Series	1995	1996	1997	1998	1999	2000	2001	Total
2	Ovid	2	26	20	27	15	3	13	98
3	Palmyra	4	10	8	16	23	18	7	86
3	Phelps	0	2	0	1	5	1	0	9
2	Romulus	0	0	0	1	0	0	0	1
1	Schoharie	1	4	15	15	3	4	114	156
4	Scriba	0	0	0	0	0	2	0	2
3	Sloan	0	1	0	2	0	3	0	6
4	Sodus	4	3	0	0	1	0	0	8
4	Stafford	0	0	0	4	0	0	0	4
2	Teel	0	1	0	2	1	1	0	5
3	Tuller	0	0	0	0	3	0	0	3
3	Wampsville	2	0	0	0	0	0	0	2
4	Williamson	3	3	0	4	3	0	1	14
-	Unknown	2	8	2	20	6	5	2	46
Total		286	387	396	1290	623	384	408	3756

4. Organic Matter

4.1 Samples for Home and Garden

Number of home and garden samples within each % organic matter range:

	<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
1995	0	0	5	1	2	3	1	1	13
1996	0	2	5	9	2	3	0	3	24
1997	0	1	7	8	9	2	2	3	32
1998	1	4	6	5	2	3	1	5	27
1999	2	0	3	4	10	2	3	2	26
2000	4	2	6	6	6	6	1	2	33
2001	1	1	3	9	6	2	0	2	24
Total	8	10	35	42	37	21	8	18	179

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	2.3	1.5	1.5	0.3	0.4	0.1	0.8	
Highest:	7.4	10.5	9.2	8.9	9.5	12.5	8.9	
Mean:	4.3	4.1	4.2	4.0	4.5	3.8	4.1	
Median:	4.2	3.7	4.0	3.3	4.5	3.9	3.9	

Percent of home and garden samples within each % organic matter range:

	<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
1995	0	0	38	8	15	23	8	8	100
1996	0	8	21	38	8	13	0	13	100
1997	0	3	22	25	28	6	6	9	100
1998	4	15	22	19	7	11	4	19	100
1999	8	0	12	15	38	8	12	8	100
2000	12	6	18	18	18	18	3	6	100
2001	4	4	13	38	25	8	0	8	100
Total	4	6	20	23	21	12	4	10	100

4.2 Samples for Commercial Production

Number of samples for commercial production within each % organic matter range:

	<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
1995	0	6	73	120	50	14	4	1	268
1996	1	16	111	190	46	12	4	7	387
1997	0	12	161	184	32	4	1	2	396
1998	2	30	427	674	141	7	5	4	1290
1999	5	7	153	311	122	19	5	1	623
2000	1	3	97	162	92	28	0	1	384
2001	2	3	78	226	81	12	6	0	408
Total	11	77	1100	1867	564	96	25	16	3756

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1.0	0.6	1.3	0.5	0.1	0.4	0.8	
Highest:	7.8	54.6	8.3	7.9	8.1	11.8	6.9	
Mean:	3.5	3.7	3.1	3.4	3.4	3.6	3.6	
Median:	3.4	3.2	3.1	3.3	3.4	3.4	3.5	

Percent of samples for commercial production within each % organic matter range:

	<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
1995	0	2	27	45	19	5	1	0	100
1996	0	4	29	49	12	3	1	2	100
1997	0	3	41	46	8	1	0	1	100
1998	0	2	33	52	11	1	0	0	100
1999	1	1	25	50	20	3	1	0	100
2000	0	1	25	42	24	7	0	0	100
2001	0	1	19	55	20	3	1	0	100
Total	0	2	29	50	15	3	1	0	100

5. pH

5.1 Samples for Home and Garden

Number of home and garden samples within each pH range:

	<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
1995	0	0	1	1	0	2	3	5	1	0	13
1996	0	0	0	0	3	5	7	9	0	0	24
1997	0	1	1	2	4	4	10	9	1	0	32
1998	0	0	0	2	0	6	13	4	2	0	27
1999	0	1	0	3	0	4	8	10	0	0	26
2000	0	0	0	3	7	1	8	12	2	0	33
2001	0	0	0	0	4	4	6	8	2	0	24
Total	0	2	2	11	18	26	55	57	8	0	179

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	5.4	6.1	4.9	5.5	4.6	5.9	6.0	
Highest:	8.0	7.8	8.0	8.1	7.8	8.1	8.1	
Mean:	-	-	-	-	-	-	-	
Median:	7.1	7.3	7.2	7.2	7.2	7.4	7.3	

Percent of home and garden samples within each pH range:

	<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
1995	0	0	8	8	0	15	23	38	8	0	100
1996	0	0	0	0	13	21	29	38	0	0	100
1997	0	3	3	6	13	13	31	28	3	0	100
1998	0	0	0	7	0	22	48	15	7	0	100
1999	0	4	0	12	0	15	31	38	0	0	100
2000	0	0	0	9	21	3	24	36	6	0	100
2001	0	0	0	0	17	17	25	33	8	0	100
Total	0	1	1	6	10	15	31	32	4	0	100

5.2 Samples for Commercial Production

Number of samples for commercial production within each pH range :

	<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
1995	0	1	10	19	45	83	71	32	6	1	268
1996	0	0	8	30	43	106	109	83	8	0	387
1997	7	3	8	22	56	84	97	99	20	0	396
1998	22	4	20	55	132	342	474	227	13	1	1290
1999	1	0	12	45	104	143	156	137	25	0	623
2000	0	0	5	26	88	99	77	69	20	0	384
2001	0	1	5	17	34	98	133	97	23	0	408
Total	30	9	68	214	502	955	1117	744	115	2	3756

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	4.9	5.0	2.2	2.2	4.1	5.0	4.9	
Highest:	12.7	8.3	8.1	8.5	8.3	8.2	8.2	
Mean:	-	-	-	-	-	-	-	
Median:	6.8	7.0	7.1	7.0	7.0	6.8	7.1	

Percent of samples for commercial production within each pH range:

	<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
1995	0	0	4	7	17	31	26	12	2	0	100
1996	0	0	2	8	11	27	28	21	2	0	100
1997	2	1	2	6	14	21	24	25	5	0	100
1998	2	0	2	4	10	27	37	18	1	0	100
1999	0	0	2	7	17	23	25	22	4	0	100
2000	0	0	1	7	23	26	20	18	5	0	100
2001	0	0	1	4	8	24	33	24	6	0	100
Total	1	0	2	6	13	25	30	20	3	0	100

6. Phosphorus

6.1 Samples for Home and Garden

Number of home and garden samples within each range Morgan extractable P range (lbs/acre Morgan P):

	<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	
1995	0	1	1	5	2	0	1	3	0	0	13
1996	0	2	5	7	3	3	1	1	0	2	24
1997	0	5	7	11	3	1	1	0	1	3	32
1998	0	0	3	6	2	3	5	4	1	3	27
1999	0	5	2	4	3	3	2	2	1	4	26
2000	0	8	5	7	3	1	1	1	1	6	33
2001	0	3	2	2	1	4	1	4	2	5	24
Total	0	24	25	42	17	15	12	15	6	23	179

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

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	2	2	1	6	2	1	2	
Highest:	132	263	350	282	310	275	329	
Mean:	51	50	50	83	80	69	111	
Median:	39	21	12	75	56	15	82	

Percent of home and garden samples within each Morgan extractable phosphorus range:

	<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	
1995	0	8	8	38	15	0	8	23	0	0	100
1996	0	8	21	29	13	13	4	4	0	8	100
1997	0	16	22	34	9	3	3	0	3	9	100
1998	0	0	11	22	7	11	19	15	4	11	100
1999	0	19	8	15	12	12	8	8	4	15	100
2000	0	24	15	21	9	3	3	3	3	18	100
2001	0	13	8	8	4	17	4	17	8	21	100
Total	0	13	14	23	9	8	7	8	3	13	100

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

6.2 Samples for Commercial Production

Number of samples submitted for commercial production within each Morgan extractable phosphorus (lbs P/acre) range:

	<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	
1995	0	37	68	136	13	6	3	1	2	2	268
1996	0	44	99	192	40	2	2	5	1	2	387
1997	0	49	103	219	21	2	0	1	0	1	396
1998	1	129	311	644	129	30	17	19	4	6	1290
1999	0	136	171	259	33	9	5	6	1	3	623
2000	0	88	127	154	6	3	1	3	1	1	384
2001	0	62	145	179	13	5	1	1	1	1	408
Total	1	545	1024	1783	255	57	29	36	10	16	3756

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

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	1	1	0.1	1	1	1	
Highest:	332	489	283	449	384	237	245	
Mean:	19	21	16	23	16	13	14	
Median:	11	12	11	13	9	7	8	

Percent of samples submitted for commercial production within each Morgan P range:

	<1	1-3	4-8	9-39	40-60	61-80	81-100	101-150	151-200	>200	Total
1995	0	14	25	51	5	2	1	0	1	1	100
1996	0	11	26	50	10	1	1	1	0	1	100
1997	0	12	26	55	5	1	0	0	0	0	100
1998	0	10	24	50	10	2	1	1	0	0	100
1999	0	22	27	42	5	1	1	1	0	0	100
2000	0	23	33	40	2	1	0	1	0	0	100
2001	0	15	36	44	3	1	0	0	0	0	100
Total	0	15	27	47	7	2	1	1	0	0	100

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

7. Potassium

7.1 Samples for Home and Garden

Number of home and garden samples within each K range (lbs K/acre Morgan extraction):

Soil Management Group 1						
	<35	35-64	65-94	95-149	>149	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	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	
1995	0	0	0	0	0	0
1996	0	0	0	5	6	11
1997	0	0	0	5	11	16
1998	0	0	0	1	5	6
1999	0	0	1	0	4	5
2000	0	1	2	3	6	12
2001	0	0	0	0	3	3
Total (#)	0	1	3	14	35	53
Total (%)	0	2	6	26	66	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	1	2	6	9
1996	0	0	2	0	3	5
1997	0	0	2	4	1	7
1998	0	0	0	2	4	6
1999	0	1	3	1	8	13
2000	6	3	0	1	5	15
2001	0	1	1	0	3	5
Total (#)	6	5	9	10	30	60
Total (%)	10	8	15	17	50	100

Ketterings, Q.M., H. Krol, W.S. Reid and S. Bossard (2003). Cayuga County Soil Sample Survey 1995-2001. CSS Extension Bulletin E03-6. 37 pages.

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	total
	Very Low	Low	Medium	High	Very High	
Unknown						
1995	0	1	0	1	0	2
1996	0	2	2	1	2	7
1997	0	1	0	5	2	8
1998	0	1	1	1	8	11
1999	0	0	1	2	2	5
2000	0	0	0	2	4	6
2001	0	0	2	3	7	12
Total (#)	0	5	6	15	25	51
Total (%)	0	10	12	29	49	100
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	1	0	1	2
1996	0	0	1	0	0	1
1997	0	0	0	1	0	1
1998	0	2	1	1	0	4
1999	2	0	0	1	0	3
2000	0	0	0	0	0	0
2001	0	2	0	1	1	4
Total (#)	2	4	3	3	2	14
Total (%)	14	29	21	21	14	100
Soil Management Group 6						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	0	0	0	0	0	0
Total (%)	-	-	-	-	-	-

Ketterings, Q.M., H. Krol, W.S. Reid and S. Bossard (2003). Cayuga County Soil Sample Survey 1995-2001. CSS Extension Bulletin E03-6. 37 pages.

Number of home and garden samples within each potassium classification:

Summary (#)	Very Low	Low	Medium	High	Very High	Un-known	Total
1995	0	1	2	3	7	0	13
1996	0	2	5	6	11	0	24
1997	0	1	2	15	14	0	32
1998	0	3	2	5	17	0	27
1999	2	1	5	4	14	0	26
2000	6	4	2	6	15	0	33
2001	0	3	3	4	14	0	24
Total #	8	15	21	43	92	0	179

Summary (%)	Very Low	Low	Medium	High	Very High	Un-known	Total
1995	0	8	15	23	54	0	100
1996	0	8	21	25	46	0	100
1997	0	3	6	47	44	0	100
1998	0	11	7	19	63	0	100
1999	8	4	19	15	54	0	100
2000	18	12	6	18	45	0	100
2001	0	13	13	17	58	0	100
Grand Total	4	8	12	24	51	0	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	76	57	66	67	23	16	70	
Highest:	985	657	576	789	759	1469	1244	
Mean:	380	212	213	291	242	223	325	
Median:	289	152	195	273	226	198	275	

7.2 Samples for Commercial Production

Number of samples submitted for commercial production within each potassium (lbs K/acre Morgan extraction) range:

Soil Management Group 1						
	<35	35-64	65-94	95-149	>149	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	0	5	5
1996	0	1	1	3	4	9
1997	0	0	2	7	6	15
1998	0	1	6	7	4	18
1999	0	0	0	1	3	4
2000	0	1	0	3	0	4
2001	0	0	61	44	12	117
Total (#)	0	3	70	65	34	172
Total (%)	0	2	41	38	20	100
Soil Management Group 2						
	<40	40-69	70-99	100-164	>164	Total
	Very Low	Low	Medium	High	Very High	
1995	1	8	29	72	102	212
1996	0	12	46	139	110	307
1997	1	35	68	154	94	352
1998	2	19	169	416	556	1162
1999	4	20	97	199	179	499
2000	0	13	50	91	66	220
2001	1	22	61	87	60	231
Total (#)	9	129	520	1158	1167	2983
Total (%)	0	4	17	39	39	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	6	13	22	41
1996	0	0	13	9	14	36
1997	0	0	5	7	5	17
1998	0	4	20	21	28	73
1999	1	6	29	37	32	105
2000	2	17	37	46	49	151
2001	0	2	10	13	28	53
Total (#)	3	29	120	146	178	467
Total (%)	1	6	25	31	37	100

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
1995	0	3	3	3	1	10
1996	1	4	11	4	1	20
1997	0	5	5	1	0	11
1998	0	4	7	4	5	20
1999	0	3	1	2	2	8
2000	0	0	4	0	1	5
2001	0	0	1	2	2	5
Total (#)	1	19	32	16	12	80
Total (%)	1	24	40	20	15	100
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	0	0	0
1996	1	3	3	2	0	9
1997	0	1	0	0	0	1
1998	0	0	0	0	0	0
1999	0	1	0	3	1	5
2000	0	1	1	0	2	4
2001	0	0	0	1	0	1
Total (#)	1	6	4	6	3	20
Total (%)	5	30	20	30	15	100
Soil Management Group 6						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	0	0	0
1996	0	0	0	1	4	5
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	0	0	0	1	4	5
Total (%)	0	0	0	20	80	100

Number of samples submitted for commercial production within each potassium classification.

Summary (#)	Very Low	Low	Medium	High	Very High	Un-known	Total
1995	1	11	38	88	130	0	268
1996	2	20	74	158	133	0	387
1997	1	41	80	169	105	0	396
1998	2	28	202	448	593	17	1290
1999	5	30	127	242	217	2	623
2000	2	32	92	140	118	0	384
2001	1	24	133	147	102	1	408
Grand Total	14	186	746	1392	1398	20	3756

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	37	49	39	4	1	42	11	
Highest:	849	1657	516	967	1220	745	641	
Mean:	200	170	141	188	172	159	139	
Median:	165	139	128	159	139	133	114	

Percent of samples submitted for commercial production within each potassium classification.

% summary	Very Low	Low	Medium	High	Very High	Un-known	Total
1995	0	4	14	33	49	0	100
1996	1	5	19	41	34	0	100
1997	0	10	20	13	27	0	100
1998	0	2	16	35	46	1	100
1999	1	5	20	39	35	0	100
2000	1	8	24	36	31	0	100
2001	0	6	33	36	25	0	100
Grand Total	0	5	20	37	37	1	100

8. Magnesium

8.1 Samples for Home and Garden

Number of home and garden samples within each Mg range (lbs Morgan Mg/acre):

	<20	20-65	66-100	101-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	1	12	13
1996	0	0	0	0	24	24
1997	0	0	1	3	28	32
1998	0	0	0	2	25	27
1999	0	0	0	0	26	26
2000	1	3	2	1	26	33
2001	0	0	0	1	23	24
Total	1	3	3	8	164	179

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	177	209	71	150	202	18	198	
Highest:	1061	1183	2336	1054	1113	1289	986	
Mean:	590	547	641	572	562	492	558	
Median:	576	533	619	597	539	502	595	

Percent of home and garden samples within each Mg range (lbs Morgan Mg/acre):

	<20	20-65	66-100	101-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	8	92	100
1996	0	0	0	0	100	100
1997	0	0	3	9	88	100
1998	0	0	0	7	93	100
1999	0	0	0	0	100	100
2000	3	9	6	3	79	100
2001	0	0	0	4	96	100
Total	1	2	2	4	92	100

8.2 Samples for Commercial Production

Number of samples submitted for commercial production within each Mg range (lbs Mg/acre Morgan extraction):

	<20	20-65	66-100	101-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	0	2	2	23	241	268
1996	0	4	0	15	368	387
1997	0	0	1	13	382	396
1998	1	0	5	38	1246	1290
1999	0	2	8	44	569	623
2000	0	1	3	27	353	384
2001	0	1	1	9	397	408
Total	1	10	20	169	3556	3756

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	22	39	82	17	54	64	59	
Highest:	4527	3022	1371	4041	1269	951	1010	
Mean:	483	553	532	517	460	450	525	
Median:	458	545	540	510	433	431	542	

Percent of samples submitted for commercial production within each magnesium range (lbs Mg/acre Morgan extraction):

	<20	20-65	66-100	101-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	0	1	1	9	90	100
1996	0	1	0	4	95	100
1997	0	0	0	3	96	100
1998	0	0	0	3	97	100
1999	0	0	1	7	91	100
2000	0	0	1	7	92	100
2001	0	0	0	2	97	100
Total	0	0	1	4	95	100

9. Iron

9.1 Samples for Home and Garden

Iron (lbs Fe/acre Morgan extraction) in samples for home and garden:

Total number of samples:

	0-49	>49	Total
	Normal	Excessive	
1995	13	0	13
1996	24	0	24
1997	31	1	32
1998	27	0	27
1999	26	0	26
2000	33	0	33
2001	24	0	24
Total	178	1	179

Percentages:

	0-49	>49	Total
	Normal	Excessive	
	100	0	100
	100	0	100
	97	3	100
	100	0	100
	100	0	100
	100	0	100
	100	0	100
	100	0	100
	99	1	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	1	1	1	1	1	1	
Highest:	19	13	86	18	45	31	45	
Mean:	5	5	10	6	9	5	8	
Median:	3	3	4	4	4	4	3	

9.2 Samples for Commercial Production

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

Total number of samples:

	0-49	>49	Total
	Normal	Excessive	
1995	266	2	268
1996	386	1	387
1997	393	3	396
1998	1285	5	1290
1999	615	8	623
2000	383	1	384
2001	408	0	408
Total	3736	20	3756

Percentages:

	0-49	>49	Total
	Normal	Excessive	
	99	1	100
	100	0	100
	99	1	100
	100	0	100
	99	1	100
	100	0	100
	100	0	100
	99	1	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	1	1	0.1	1	1	1	
Highest:	105	62	71	65	347	53	43	
Mean:	6	6	5	5	7	6	3	
Median:	3	3	3	3	4	3	2	

10. Manganese

10.1 Samples for Home and Garden

Manganese (lbs Mn/acre Morgan extraction) in samples for home and garden:

Total number of samples:

	0-99	>99	Total
	Normal	Excessive	
1995	13	0	13
1996	22	2	24
1997	30	2	32
1998	27	0	27
1999	25	1	26
2000	32	1	33
2001	24	0	24
Total	173	6	179

Percentages:

0-99	>99	Total
Normal	Excessive	
100	0	100
92	8	100
94	6	100
100	0	100
96	4	100
97	3	100
100	0	100
97	3	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	31	12	12	15	17	3	22	
Highest:	86	157	170	73	111	100	95	
Mean:	53	41	47	36	49	32	47	
Median:	52	31	46	33	47	29	45	

10.2 Samples for Commercial Production

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

Total number of samples:

	0-99	>99	Total
	Normal	Excessive	
1995	267	1	286
1996	378	9	387
1997	394	2	396
1998	1274	16	1290
1999	618	5	623
2000	379	5	384
2001	406	2	408
Total	3716	40	3756

Percentages:

	0-99	>99	Total
	Normal	Excessive	
	100	0	100
	98	2	100
	99	1	100
	99	1	100
	99	1	100
	99	1	100
	100	0	100
	99	1	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	7	5	8	3	6	10	5	
Highest:	115	421	131	306	160	201	162	
Mean:	31	38	32	32	36	32	33	
Median:	28	33	28	30	34	28	32	

11. Zinc

11.1 Samples for Home and Garden

Zinc (lbs Zn/acre Morgan extraction) in samples for home and garden:

Total number of samples:					Percentages:				
	<0.5	0.5-1.0	>1	Total	<0.5	0.5-1.0	>1	Total	
	Low	Medium	High		Low	Medium	High		
1995	0	5	8	13	0	38	62	100	
1996	0	6	18	24	0	25	75	100	
1997	0	8	24	32	0	25	75	100	
1998	0	2	25	27	0	7	93	100	
1999	0	4	22	26	0	15	85	100	
2000	6	8	19	33	18	24	58	100	
2001	0	2	22	24	0	8	92	100	
Total	6	35	138	179	3	20	77	100	

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	0.8	0.6	0.5	0.8	0.6	0.2	0.8	
Highest:	8.5	45.8	59.5	76.3	93.0	69.7	50.4	
Mean:	2.9	6.3	9.9	12.7	12.8	7.2	9.7	
Median:	2.0	2.1	2.7	3.8	4.2	2.0	5.8	

11.2 Samples for Commercial Production

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

Total number of samples:

	<0.5	0.5-1.0	>1	Total
	Low	Medium	High	
1995	24	102	142	268
1996	26	201	160	387
1997	24	212	160	396
1998	61	473	756	1290
1999	67	284	272	623
2000	48	260	76	384
2001	25	176	207	408
Total	275	1708	1773	3756

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
9	38	53	100
7	52	41	100
6	54	40	100
5	37	59	100
11	46	44	100
13	68	20	100
6	43	51	100
7	45	47	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	0.2	0.3	0.2	0.0	0.1	0.1	0.1	
Highest:	63.3	31.0	83.1	437.3	37.2	9.4	26.6	
Mean:	1.9	1.4	1.6	3.7	1.3	1.1	1.6	
Median:	1.1	0.9	0.9	1.3	0.9	1.0	1.1	

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
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

Crop Code	Crop Description
BDR/BND	Beans-dry
BLU	Blueberries
CEL	Celery
CEM	Cemetery
FAR	Fairway
FLA	Flowering Annuals
GAR	Garlic
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