

Ketterings, Q.M., H. Krol, W.S. Reid and K. Ganoë (2004). Fulton County Soil Sample Survey 1995-2001. CSS Extension Bulletin E04-12. 36 pages.

Soil Sample Survey

Fulton Co.

Samples analyzed by CNAL in 1995-2001



Summary compiled by

Quirine M. Ketterings, Hettie Krol, W. Shaw Reid and K. Ganoë



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

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March 20, 2004

Correct Citation:

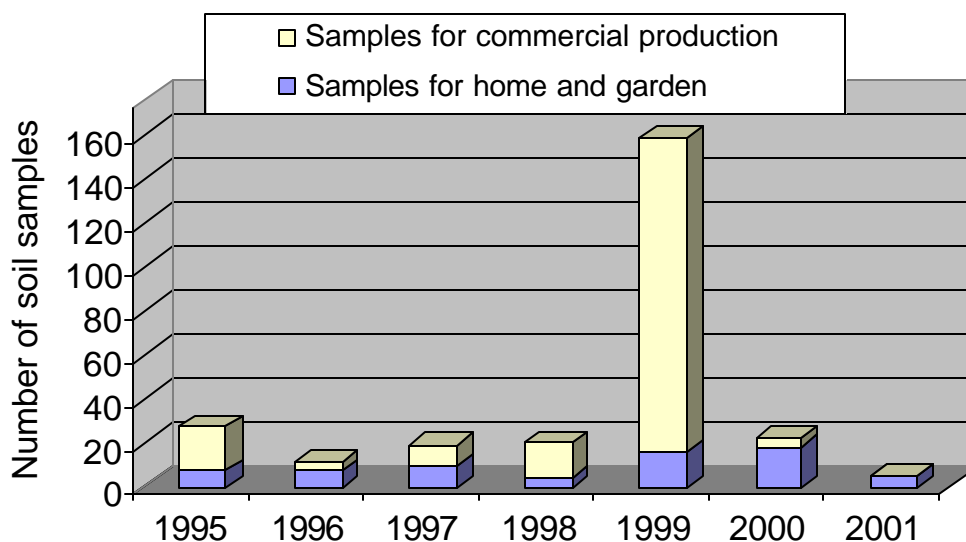
Ketterings, Q.M., H. Krol, W.S. Reid, and K. Ganoë (2004). Soil samples survey of Fulton County. Samples analyzed by the Cornell Nutrient Analysis Laboratory in 1995-2001. CSS Extension Bulletin E04-12. 36 pages.

Table of Content

1. General Survey Summary.....	4
2. Cropping Systems	9
2.1 Samples for Home and Garden.....	9
2.2 Samples for Commercial Production.....	10
3. Soil Types	11
3.1 Samples for Home and Garden.....	11
3.2 Samples for Commercial Production.....	12
4. Organic Matter	13
4.1 Samples for Home and Garden.....	13
4.2 Samples for Commercial Production.....	14
5. pH	15
5.1 Samples for Home and Garden.....	15
5.2 Samples for Commercial Production.....	16
6. Phosphorus.....	17
6.1 Samples for Home and Garden.....	17
6.2 Samples for Commercial Production.....	18
7. Potassium	19
7.1 Samples for Home and Garden.....	19
7.2 Samples for Commercial Production.....	22
8. Magnesium	25
8.1 Samples for Home and Garden.....	25
8.2 Samples for Commercial Production.....	26
9. Iron.....	27
9.1 Samples for Home and Garden.....	27
9.2 Samples for Commercial Production.....	28
10. Manganese	29
10.1 Samples for Home and Garden.....	29
10.2 Samples for Commercial Production.....	30
11. Zinc	31
11.1 Samples for Home and Garden.....	31
11.2 Samples for Commercial Production.....	32
Appendix: Cornell Crop Codes	33

1. General Survey Summary

This survey summarizes the soil test results from Fulton County soil samples submitted for analyses to the Cornell Nutrient Analysis Laboratory (CNAL) during 1995-2001. The total number of samples analyzed in these years amounted to 262. Of these 262 samples, 197 (75%) were submitted to obtain fertilizer recommendations for commercial production while 65 samples (25%) were submitted as home and garden samples. Most of the samples were submitted in 1999. Because of the low number of samples and unequal distribution, percentage distributions in each of the soil fertility classes are based on the 7-year average.



Homeowners		Commercial		Total
1995	7	1995	20	27
1996	7	1996	4	11
1997	9	1997	10	19
1998	4	1998	16	20
1999	15	1999	143	158
2000	18	2000	4	22
<u>2001</u>	<u>5</u>	<u>2001</u>	<u>0</u>	<u>5</u>
Total	65	Total	197	262

Forty percent of the home and garden samples were submitted to request fertilizer recommendations for mixed vegetable gardens. Twenty-five percent of the samples came from lawns while a few additional samples were sent in to request recommendations for azaleas, blueberries, greens, grapes, perennials, potatoes, raspberries, ornamentals and tree fruits. People submitting samples for commercial production requested fertilizer recommendations for alfalfa, alfalfa/grass or alfalfa/trefoil mixtures (34%), corn silage or grain production (28%), or grass hay (13%), while a few producers were planning on growing other crops including small grains, pasture land, and sweet corn.

Home and garden samples in Fulton County were silty (9%), silt loams (12%), sandy loams (57%), or sandy (22%), belonging to soil management groups 2, 3, 4, and 5, respectively. 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, 59% belonged to soil management group 2. None of the samples belonged to group 6 while 1% was classified group 1, 4% belonged to soil management group 3, 25% were from management group 4, 4% were

classified as management group 5 and the remainder was of unknown classification. The six most common soil series were Lansing (29%), Appleton (9%), Charlton (8%), Broadalbin (6%), Mohawk (4%) and Churchville (4%).

Organic matter levels, as measured by loss on ignition, ranged from 1% to over 50% with median values ranging from 3.6 to 4.8% organic matter for home and garden samples and from 3.8 to 4.9% for samples submitted for commercial production. Sixty-five percent of the home and garden samples had between 2.0 and 4.9% organic matter with 10 samples testing between 2.0 and 2.9% organic matter, 15 between 3.0 and 3.9% organic matter and 17 between 4.0 and 4.9% organic matter. Twenty-three percent of the soils submitted for home and garden tested >4.9% in organic matter while 12% of the samples had less than 2.0% organic matter. Of the samples submitted for commercial production, 35% contained between 3.0 and 3.9% organic matter, 30% tested between 4.0 and 4.9% while 11% had organic matter concentrations of 5.0-5.9%. Nineteen percent had less than 3.0% organic matter while 5% of the samples had 6.0% or more organic matter. In total, 45% of the samples had organic matter levels between 4.0 and 6.9%.

Soil pH in water (1:1 extraction ratio) varied from pH 4.4 to pH 7.9 with the median for home and garden samples ranging from pH 6.1 to pH 6.9 and for samples submitted for commercial production ranging from pH 5.6 to pH 6.6. Of the home and garden samples, 69% tested between pH 6.0 and 7.4. For the samples submitted for commercial production, this was 79% while 18% tested between pH 5.0 and pH 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 solution and extraction 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 soils with >39 lbs P/acre are classified as very high. Of the home and garden samples, 40% tested low, 15% tested medium, 23% tested high and 22% tested very high. This meant that 45% tested high or very high in P. Of the samples submitted for commercial production, 55% tested low in P. Twenty-eight percent were medium in P,

16% tested high while 1% was very high in P. This means that 176% tested high or very high in P. There were no clear trends in P levels over the 7 years.

Classifications for potassium depend on soil management group. 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. 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 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, 24 samples (37%) were classified as very low or low in potassium. Eighteen percent tested medium, another 22% were high and 23% were very high in potassium. For samples submitted for commercial production, 10% were very low in K, 26% tested low, 22% tested medium, 19% tested high and 17% tested very high in potassium while the remainder was of unknown K classification. As with phosphorus, there were no trends over the 7 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 19 to slightly over 1200 lbs Mg/acre (Morgan extraction). There was only 1 sample in the combined home and garden and commercial agriculture datasets that tested very low in Mg. Most soils tested high or very high for Mg (86% of the homeowner soils and 89% of the soils of the commercial growers). Nine of the home/garden samples and 26 (13%) of the commercial soils tested low or medium in Mg. Thus, magnesium deficiency is not likely to occur in Fulton County provided the soil pH is maintained in the desirable range.

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. Ninety-four percent of the home and garden samples were classified as normal in Fe while 97% of the commercial samples tested in the normal range for Fe. Similarly, almost all soils with the exception of one home and garden sample 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 zinc 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 home and garden samples, six samples tested low for zinc while 11 tested medium and 48 (74%) tested high for zinc. Of the samples for commercial production, 6% tested low in zinc, 38% tested medium while 56% of the samples were 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	%
ATF	0	0	0	0	3	0	0	3	5
BLU	0	0	0	0	1	0	0	1	2
GEN	2	0	0	0	0	0	0	2	3
GRA	0	0	0	0	1	0	0	1	2
LAW	1	1	5	2	1	4	2	16	25
MVG	3	5	1	2	3	10	2	26	40
OTH	0	0	0	0	1	0	0	1	2
PER	1	0	2	0	0	0	0	3	5
PTO	0	0	0	0	1	0	0	1	2
RSP	0	1	0	0	0	0	0	1	2
SAG	0	0	1	0	4	0	1	6	9
TRF	0	0	0	0	0	4	0	4	6
Total	7	7	9	4	15	18	5	65	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	1	1	0	1	3	0	0	6	3
AGE/AGT	8	0	0	5	25	1	0	39	20
ALE/ALT	0	0	0	0	21	0	0	21	11
APP	4	0	0	0	0	0	0	4	2
BGE/BGT	0	0	0	0	0	1	0	1	1
BUK	0	0	1	0	0	0	0	1	1
CGE/CGT	0	0	2	0	13	0	0	15	8
CLE/CLT	1	0	0	0	4	0	0	5	3
COG/COS	3	1	0	0	52	0	0	56	28
GRE/GRT	0	0	3	2	21	0	0	26	13
LET	0	0	1	0	0	0	0	1	1
MIX	1	2	0	1	0	1	0	5	3
OAS	0	0	0	0	1	0	0	1	1
OTH	0	0	0	1	0	0	0	1	1
PAR	1	0	0	0	0	0	0	1	1
PGE/PGT	1	0	1	0	0	0	0	2	1
PLE/PLT	0	0	0	0	1	1	0	2	1
PNE/PNT	0	0	2	2	0	0	0	4	2
RYS	0	0	0	0	1	0	0	1	1
SWC	0	0	0	4	1	0	0	5	3
Total	20	4	10	16	143	4	0	197	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	0
SMG 2 (silty)	0	0	1	0	3	2	0	6	9
SMG 3 (silt loam)	2	1	0	0	2	3	0	8	12
SMG 4 (sandy loam)	4	3	5	3	6	11	5	37	57
SMG 5 (sandy)	1	3	3	1	4	2	0	14	22
SMG 6 (mucky)	0	0	0	0	0	0	0	0	0
Total	7	7	9	4	15	18	5	65	100

3.2 Samples for Commercial Production

Soil series for samples submitted for commercial production:

Name	SMG	1995	1996	1997	1998	1999	2000	2001	Total	%
Agawam	4	0	0	0	0	2	0	0	2	1
Angola	2	0	0	0	0	4	0	0	4	2
Appleton	2	0	0	1	2	15	0	0	18	9
Broadalbin	4	0	0	0	1	9	1	0	11	6
Charlton	4	1	0	4	10	0	0	0	15	8
Churchville	2	0	0	0	0	8	0	0	8	4
Darien	2	3	0	0	0	3	0	0	6	3
Farmington	3	0	0	0	0	3	0	0	3	2
Fonda	2	0	0	0	0	1	0	0	1	1
Fredon	4	0	0	0	0	3	0	0	3	2
Galway	4	5	0	0	0	1	0	0	6	3
Granby	5	0	0	0	0	2	0	0	2	1
Howard	3	0	0	1	0	3	0	0	4	2
Ilion	2	1	0	1	0	3	0	0	5	3
Lansing	2	2	0	2	1	52	0	0	57	29
Leicester	4	0	1	0	0	0	0	0	1	1
Madalin	1	0	0	0	1	1	0	0	2	1
Manheim	2	0	0	0	0	5	0	0	5	3
Mohawk	2	0	1	1	0	6	0	0	8	4
Mosherville	4	1	0	0	0	1	2	0	4	2
Nellis	4	1	0	0	0	0	0	0	1	1
Palatine	2	0	0	0	0	2	0	0	2	1
Rhinebeck	2	1	1	0	0	0	0	0	2	1
Scio	3	0	0	0	0	1	0	0	1	1
Sudbury	4	0	0	0	0	3	0	0	3	2
Sutton	4	1	1	0	1	0	0	0	3	2
Windsor	5	0	0	0	0	6	0	0	6	3
Woodbridge	4	1	0	0	0	0	0	0	1	1
Unknown	-	3	0	0	0	9	1	0	13	7
Total	-	20	4	10	16	143	4	0	197	100

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	1	1	2	1	1	0	1	7
1996	0	0	2	1	1	1	1	1	7
1997	0	1	3	1	1	0	1	2	9
1998	0	0	1	1	1	0	0	1	4
1999	0	3	1	4	4	1	1	1	15
2000	2	0	2	5	8	1	0	0	18
2001	0	1	0	1	1	0	0	2	5
Total	2	6	10	15	17	4	3	8	65

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1.8	2.9	1.9	2.7	1.6	0.8	1.7	
Highest:	9.9	8.4	50.2	7.0	7.9	5.2	12.4	
Mean:	4.3	4.7	9.8	4.2	3.9	3.5	6.3	
Median:	3.5	4.4	3.7	3.6	3.7	4.0	4.8	

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
1996
1997
1998
1999
2000
2001
Total	3	9	15	23	26	6	5	12	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	3	5	4	5	3	0	0	20
1996	0	0	0	1	0	1	0	2	4
1997	0	0	1	3	2	3	0	1	10
1998	0	0	1	3	5	5	2	0	16
1999	0	0	27	56	46	10	4	0	143
2000	0	0	0	2	2	0	0	0	4
2001	0	0	0	0	0	0	0	0	0
Total	0	3	34	69	60	22	6	3	197

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1.7	3.0	2.3	2.2	2.0	3.1	.	
Highest:	5.4	7.3	7.0	6.8	6.8	4.7	.	
Mean:	3.5	5.7	4.6	4.8	3.8	4.1	.	
Median:	3.6	6.2	4.2	4.9	3.8	4.2	.	

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	100
1996	100
1997	100
1998	100
1999	100
2000	100
2001	100
Total	0	2	17	35	30	11	3	2	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	1	0	1	0	2	0	2	1	0	0	7
1996	0	0	0	2	1	1	2	1	0	0	7
1997	0	0	3	0	3	0	3	0	0	0	9
1998	0	0	1	0	1	1	0	1	0	0	4
1999	0	1	1	2	3	2	5	1	0	0	15
2000	0	0	0	2	9	3	3	1	0	0	18
2001	0	0	1	0	0	2	2	0	0	0	5
Total	1	1	7	6	19	9	17	5	0	0	65

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	4.4	5.6	5.0	5.4	4.8	5.7	5.2	
Highest:	7.5	7.9	7.4	7.5	7.5	7.6	7.4	
Mean:	-	-	-	-	-	-	-	
Median:	6.4	6.9	6.1	6.4	6.7	6.4	6.8	

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
1996
1997
1998
1999
2000
2001
Total	2	2	11	9	29	14	26	8	0	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	1	3	8	6	1	0	0	0	20
1996	0	0	1	3	0	0	0	0	0	0	4
1997	0	2	0	2	2	4	0	0	0	0	10
1998	0	1	2	7	3	3	0	0	0	0	16
1999	0	0	2	13	47	44	35	2	0	0	143
2000	0	0	0	1	1	1	1	0	0	0	4
2001	0	0	0	0	0	0	0	0	0	0	0
Total	0	4	6	29	61	58	37	2	0	0	197

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	4.8	5.2	4.8	4.7	5.3	5.8	.	
Highest:	7.4	5.8	6.9	6.8	7.6	7.2	.	
Mean:	-	-	-	-	-	-	-	
Median:	6.3	5.6	6.2	5.7	6.6	6.5	.	

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
1996
1997
1998
1999
2000
2001
Total	0	2	3	15	31	29	19	1	0	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	4	2	0	1	0	0	0	0	0	7
1996	0	1	1	2	1	0	1	0	0	1	7
1997	0	2	1	5	1	0	0	0	0	0	9
1998	0	1	0	1	1	0	0	0	1	0	4
1999	0	3	3	6	0	1	0	1	1	0	15
2000	0	14	2	1	0	0	0	0	0	1	18
2001	0	1	1	0	0	0	2	1	0	0	5
Total	0	26	10	15	4	1	3	2	2	2	65

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

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	3	2	3	1	1	2	
Highest:	58	408	56	157	164	237	106	
Mean:	11	85	16	55	34	16	59	
Median:	3	24	10	29	17	1	86	

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
1996
1997
1998
1999
2000
2001
Total	0	40	15	23	6	2	5	3	3	3	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	11	7	1	0	0	0	1	0	0	20
1996	0	2	1	1	0	0	0	0	0	0	4
1997	0	5	3	2	0	0	0	0	0	0	10
1998	0	13	3	0	0	0	0	0	0	0	16
1999	0	73	42	27	1	0	0	0	0	0	143
2000	0	4	0	0	0	0	0	0	0	0	4
2001	0	0	0	0	0	0	0	0	0	0	0
Total	0	108	56	31	1	0	0	1	0	0	197

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

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	1	2	1	1	1	.	
Highest:	125	17	13	5	55	2	.	
Mean:	10	6	5	2	6	1	.	
Median:	2	3	3	1	3	1	.	

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
	VL	L	M	H	VH	VH	VH	VH	VH	VH	
1995
1996
1997
1998
1999
2000
2001
Total	0	55	28	16	1	0	0	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	0	0	0
1997	0	0	0	0	1	1
1998	0	0	0	0	0	0
1999	0	2	0	0	1	3
2000	2	0	0	0	0	2
2001	0	0	0	0	0	0
Total (#)	2	2	0	0	2	6
Total (%)	33	33	0	0	33	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	2	0	0	2
1996	0	0	0	0	1	1
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	1	1	2
2000	2	1	0	0	0	3
2001	0	0	0	0	0	0
Total (#)	2	1	2	1	2	8
Total (%)	.	.	.	.	.	.

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
1995	1	0	2	1	0	4
1996	0	0	1	1	1	3
1997	0	0	1	2	2	5
1998	0	1	1	0	1	3
1999	0	1	2	2	1	6
2000	9	1	0	0	1	11
2001	0	0	1	2	2	5
Total (#)	10	3	8	8	8	37
Total (%)	.	.	.	.	.	.
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	1	0	1
1996	0	0	1	1	1	3
1997	0	3	0	0	0	3
1998	0	0	0	0	1	1
1999	0	1	0	2	1	4
2000	0	0	1	1	0	2
2001	0	0	0	0	0	0
Total (#)	0	4	2	5	3	14
Total (%)	.	.	.	.	.	.
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 (%)	.	.	.	.	.	.

Number of home and garden samples within each potassium classification:

Summary (#)	Very Low	Low	Medium	High	Very High	Total
1995	1	0	4	2	0	7
1996	0	0	2	2	3	7
1997	0	3	1	2	3	9
1998	0	1	1	0	2	4
1999	0	4	2	5	4	15
2000	13	2	1	1	1	18
2001	0	0	1	2	2	5
Total #	14	10	12	14	15	65

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	42	107	64	83	71	17	147	
Highest:	170	1148	477	499	482	374	601	
Mean:	109	349	193	247	193	70	290	
Median:	101	233	166	203	173	39	174	

Percent of samples submitted for home and garden within each potassium classification.

Summary (%)	Very Low	Low	Medium	High	Very High	Total
1995
1996
1997
1998
1999
2000
2001
Grand Total	22	15	18	22	23	100

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	0	0
1996	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	0	0	0	1	0	1
1999	1	0	0	0	0	1
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	1	0	0	1	0	2
Total (%)	.	.	.	.	.	.
Soil Management Group 2						
	<40	40-69	70-99	100-164	>164	Total
	Very Low	Low	Medium	High	Very High	
1995	0	2	1	1	3	7
1996	1	0	0	0	1	2
1997	0	0	0	2	3	5
1998	0	1	2	0	0	3
1999	3	18	30	26	22	99
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	4	21	33	29	29	116
Total (%)	.	.	.	.	.	.
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	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	1	0	0	1
1998	0	0	0	0	0	0
1999	0	1	1	3	2	7
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	0	1	2	3	2	8
Total (%)	.	.	.	.	.	.

Ketterings, Q.M., H. Krol, W.S. Reid and K. Ganoie (2004). Fulton County Soil Sample Survey 1995-2001. CSS Extension Bulletin E04-12. 36 pages.

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
1995	1	3	0	4	2	10
1996	0	2	0	0	0	2
1997	1	3	0	0	0	4
1998	0	7	3	1	1	12
1999	7	9	3	0	0	19
2000	1	1	1	0	0	3
2001	0	0	0	0	0	0
Total (#)	10	25	7	5	3	50
Total (%)	.	.	.	.	.	.
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	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	3	4	1	0	0	8
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	3	4	1	0	0	8
Total (%)	.	.	.	.	.	.
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 K. Ganoie (2004). Fulton County Soil Sample Survey 1995-2001. CSS Extension Bulletin E04-12. 36 pages.

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

Summary (#)	Very Low	Low	Medium	High	Very High	Un-known	Total
1995	1	5	1	5	5	3	20
1996	1	2	0	0	1	0	4
1997	1	3	1	2	3	0	10
1998	1	8	5	1	1	0	16
1999	14	32	35	29	24	9	143
2000	1	1	1	0	0	1	4
2001	0	0	0	0	0	0	0
Grand Total	19	51	43	37	34	13	197

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	25	34	29	59	23	43	.	
Highest:	2255	371	263	258	1164	111	.	
Mean:	255	145	116	103	122	86	.	
Median:	150	87	99	92	92	95	.	

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

% summary	Very Low	Low	Medium	High	Very High	Un-known	Total
1995
1996
1997
1998
1999
2000
2001
Grand Total	10	26	22	19	17	7	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	1	3	1	2	7
1996	0	0	0	3	4	7
1997	0	1	0	4	4	9
1998	0	0	1	0	3	4
1999	0	1	0	2	12	15
2000	0	1	1	8	8	18
2001	0	0	0	1	4	5
Total	0	4	5	19	37	65

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	50	101	45	76	56	43	132	
Highest:	838	1281	514	586	724	465	1088	
Mean:	217	413	224	367	390	209	509	
Median:	95	357	194	404	376	168	235	

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
1996
1997
1998
1999
2000
2001
Total	0	6	8	29	57	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	4	2	2	12	20
1996	0	0	0	3	1	4
1997	1	2	0	0	7	10
1998	0	1	4	4	7	16
1999	0	7	6	15	115	143
2000	0	0	0	0	4	4
2001	0	0	0	0	0	0
Total	1	14	12	24	146	197

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	41	122	19	34	40	233	.	
Highest:	745	258	861	479	1035	563	.	
Mean:	300	171	325	198	366	350	.	
Median:	266	153	317	185	353	301	.	

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
1996
1997
1998
1999
2000
2001
Total	1	7	6	12	74	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	5	2	7
1996	7	0	7
1997	8	1	9
1998	4	0	4
1999	14	1	15
2000	18	0	18
2001	5	0	5
Total	61	4	65

Percentages:

	0-49	>49	Total
	Normal	Excessive	
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	94	6	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	4	8	5	2	4	2	3	
Highest:	247	12	179	29	60	43	29	
Mean:	54	11	28	12	14	14	9	
Median:	19	11	9	9	10	11	5	

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	19	1	20
1996	4	0	4
1997	9	1	10
1998	14	2	16
1999	142	1	143
2000	4	0	4
2001	0	0	0
Total	192	5	197

Percentages:

	0-49	>49	Total
	Normal	Excessive	
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	97	3	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	2	4	2	5	1	4	.	
Highest:	69	28	52	109	58	28	.	
Mean:	11	16	17	30	8	14	.	
Median:	8	15	8	17	5	12	.	

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	7	0	7
1996	7	0	7
1997	8	1	9
1998	4	0	4
1999	15	0	15
2000	18	0	18
2001	5	0	5
Total	64	1	65

Percentages:

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

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	10	17	7	15	4	3	9	
Highest:	24	44	215	30	49	32	56	
Mean:	18	29	48	23	26	14	32	
Median:	18	27	23	24	23	11	31	

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	20	0	20
1996	4	0	4
1997	10	0	10
1998	16	0	16
1999	143	0	143
2000	4	0	4
2001	0	0	0
Total	197	0	197

Percentages:

	0-99	>99	Total
	Normal	Excessive	
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	100	0	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	3	7	14	6	3	4	.	
Highest:	48	39	42	36	43	31	.	
Mean:	24	20	25	18	18	21	.	
Median:	25	16	24	15	16	19	.	

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:

	<0.5	0.5-1.0	>1	Total
	Low	Medium	High	
1995	0	2	5	7
1996	0	0	7	7
1997	0	0	9	9
1998	0	1	3	4
1999	0	2	13	15
2000	6	6	6	18
2001	0	0	5	5
Total	6	11	48	65

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
9	17	74	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	0.7	1.9	1.4	0.1	0.5	0.3	4.2	
Highest:	4.1	82.2	26.2	5.3	37.1	28.5	73.0	
Mean:	2.0	25.6	7.4	3.1	9.3	3.0	20.0	
Median:	2.1	6.3	2.1	3.0	5.6	0.8	7.7	

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	1	8	11	20
1996	1	0	3	4
1997	0	2	8	10
1998	1	6	9	16
1999	8	58	77	143
2000	0	1	3	4
2001	0	0	0	0
Total	11	75	111	197

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
6	38	56	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	0.4	0.4	0.9	0.3	0.4	0.8	.	
Highest:	3.2	5.8	3.7	2.9	3.4	1.5	.	
Mean:	1.4	2.9	1.8	1.5	1.2	1.2	.	
Median:	1.1	2.7	1.5	1.2	1.1	1.3	.	

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	
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
PNE	Pasture native grasses, Established
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
APR	Apricots

Crop Code	Crop Description
ASP	Asparagus
ATF	Athletic Field
BDR/BND	Beans-dry
BLU/BLB	Blueberries
CEM	Cemetery
EGG	Eggplants
END	Endives
FAR	Fairway
FLA	Flowering Annuals
GPA	Grapes, American
GPF	Grapes, French-American
GPV	Grapes, Vinifera
GEN	Green
GRA	Grapes
HRB	Herbs
IDL	Idle land
LAW	Lawn
LET	Lettuce
MIX/MVG	Mixed vegetables
MML	Muskmelon
NUR	Nursery
ONS	Onion-seeded
OTH	Other
PAR	Pears
PCH	Peaches
PEA	Peas
PEP	Peppers
PER	Perennials
POP	Popcorn
PRK	Park
POT/PTO	Potatoes
PUM	Pumpkins
ROD	Roadside
ROS	Roses
ROU	Rough
RSF	Raspberries, Fall
RSP	Raspberries (homeowners)
RSS	Raspberries, Summer
SAG	Ornamentals adapted to pH 6.0 to 7.5

Crop Code	Crop Description
SQS	Squash, Summer
SQW	Squash, Winter
STE	Strawberries, Ever
STR	Strawberries (homeowners)
STS	Strawberries, Spring
SUN	Sunflowers
SWC	Sweet corn
TOM	Tomatoes
TRE	Christmas trees, Established
TRF	Tree fruits
TRT	Christmas trees, Topdressing