

Soil Sample Survey

Franklin Co.

Samples analyzed by CNAL in 1995-2001



Farming in Franklin County.

Summary compiled by

Quirine M. Ketterings, Hettie Krol, W. Shaw Reid and Carl Tillinghast



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

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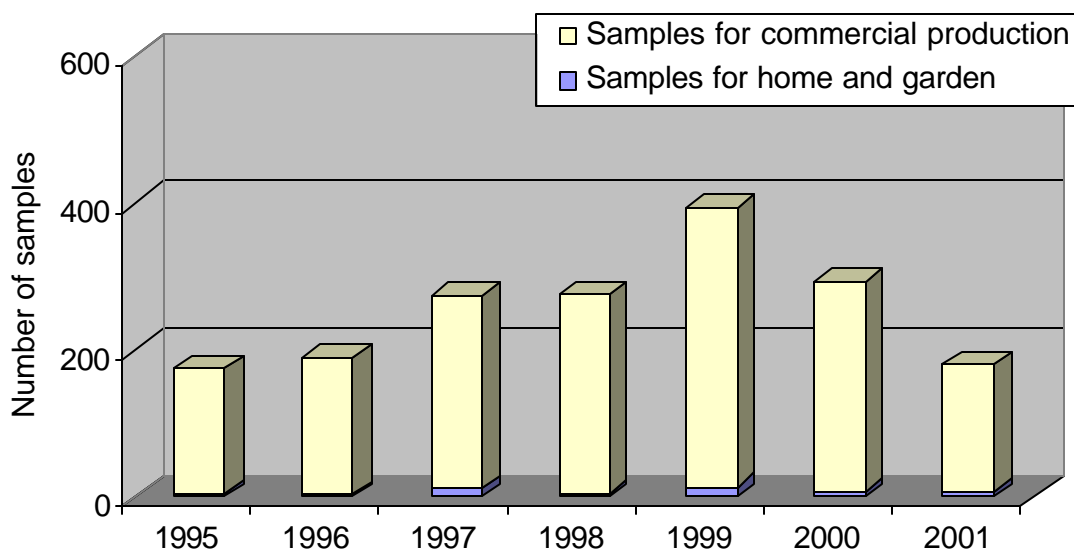
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1. General Survey Summary

This survey summarizes the soil test results from Franklin 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 1784. Of these 1728 samples (97%) were submitted to obtain fertilizer recommendations for commercial production while 56 samples (3%) was submitted as home and garden samples.



Homeowners		Commercial		Total
1995	4	1995	171	175
1996	3	1996	187	190
1997	13	1997	261	274
1998	4	1998	272	276
1999	15	1999	379	394
2000	9	2000	285	294
<u>2001</u>	<u>8</u>	<u>2001</u>	<u>173</u>	<u>181</u>
Total	56	Total	1728	1784

Of the 56 home and garden samples submitted in the 6 year period, 14 samples were submitted to request fertilizer recommendations for mixed vegetable production and 9 (16%) were lawn samples. People submitting samples for commercial production requested fertilizer recommendations to grow alfalfa or alfalfa/grass mixtures (27%), corn silage or grain (26%), grass hay (21%) while a few producers were planning on growing other crops including clover-grass mixtures, pasture, potatoes, soybeans, mixed vegetables and Christmas trees. Home and garden samples in Franklin County were mostly sandy (25 samples), silt loam (15 samples) or sandy loam soils (10 samples). 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, 65% belonged to soil management group 4. Seventeen percent belonged to group 5, while group 1, 2, and 3 were represented with 11, 3, and 1%, respectively. The five most common soil series were Empeyville (24%), Adams (6%), Coveytown (5%), Madalin (5%) and Westbury (5%). These soils represent 7.8% (Empeyville), 3.4% (Adams), 1.3% (Coveytown), 1.8% (Madalin) and 3.4% (Westbury) of the total 310,000 acres (177,600 acres of farmland) in the county.

Organic matter levels, as measured by loss on ignition, ranged from less than 1% to a little less than 30%. A few homeowner samples submitted in 1995 showed an organic matter level of 30% or higher. These samples were most likely potting soils rather than natural mineral soils. Of the home and garden samples 50% tested between 2 and 5% organic matter. The average (excluding the high organic matter samples submitted in 1995) ranged from 3.2% organic matter in 1997 to 5.1% in 1998 and 2001. Twenty nine percent of the soils submitted for home and garden tested higher than 4.9% organic matter. Of the samples submitted for commercial production, 60% contained between 3 and 4% organic matter and 27% tested between 4.0 and 4.9%. The average organic matter content ranged from 3.6% in 1999 to 4.2% in 1995. In total, 80% of the samples had organic matter levels between 2 and 5%.

Soil pH in water (1:1 extraction ratio) varied from pH 3.8 to 8.0. Of the home and garden samples, 66% tested between pH 6.0 and 7.4. For the samples submitted for commercial production, this was 77% while 22% tested between pH 5.0 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 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 soils with >39 lbs P/acre are classified as very high. Of the home and garden samples, 41% tested low, 18% medium, 23% high and 18% tested very high. This meant that 41% tested high or very high in P.

Phosphorus levels for samples for commercial production in Franklin County were lower than the state average (50% tests high or very high in P). Only 3% tested very high. Twenty six percent was low in P, 33% tested medium while 38% of the submitted samples were classified as high in soil test P. This means that 41% tested high or very high in P and that for 97% of the fields sampled in the 6 year period there would have been a P recommendation for corn. There were no clear trends in P levels over the 6 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, <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, 20% were classified as very low in potassium. Twenty percent tested low, 13% medium, 29% high and 20% very high. For samples submitted for commercial production, 7% tested very low in K, 22% tested low, 23% medium, 24% high and 22% tested very high in potassium. As with phosphorus, 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 10 to over 2000 lbs Mg/acre (Morgan extraction). There were only seven samples that tested very low in Mg. Of the 56 home and garden samples, 9 tested low, 3 were medium, 14 were high and 27 were very high in magnesium. Of the samples submitted for commercial production, most tested high or very high (93%).

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 89-95% in the normal range with 11% of the home and garden samples and 5% of the samples for commercial production testing excessive for Fe. Similarly, most soils (98-99%) 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. Soils with less than 0.5 lbs Zinc per acre in the Morgan extraction are classified as low in Zn. Medium testing soils have between 0.5 and 1 lbs of Morgan extractable Zn per acre. If more than 1 lbs of Zn/acre is extracted with the Morgan solution, the soil tests high in Zn. For the home and garden samples, 79% tested high for zinc while 20% tested medium. Of the samples for commercial production, 1% tested low in zinc, 16% tested medium while 82% were high in zinc.

In the following sections, the summary tables for each of the soil fertility indicators described above are given. Because only 56 samples were submitted for home and garden production during 1995-2001, we did not present distribution percentages for each of the individual year but rather showed averages over the 6 year period. The Appendix contains the Cornell 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	0	0	0	3	3	5
ATF	0	0	4	0	2	1	0	7	13
BLU	0	0	0	0	0	1	1	2	4
CEM	0	0	1	0	0	1	0	2	4
GEN	0	0	4	0	3	0	0	7	13
LAW	0	0	1	0	6	2	0	9	16
MVG	1	2	2	4	3	0	2	14	25
OTH	0	0	0	0	0	0	1	1	2
PER	0	0	0	0	1	0	0	1	2
PTO	0	1	0	0	0	0	0	1	2
ROD	2	0	0	0	0	0	0	2	4
RSP	0	0	0	0	0	2	0	2	4
SAG	1	0	0	0	0	2	1	4	7
STR	0	0	1	0	0	0	0	1	2
Total	4	3	13	4	15	9	8	56	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	2	1	0	0	0	0	2	5	0
AGE/AGT	33	51	43	46	46	62	31	312	18
ALE/ALT	7	13	31	38	33	20	13	155	9
APP	0	0	0	0	1	0	0	1	0
BCE/BCT	0	1	6	0	0	0	0	7	0
BGE/BGT	0	0	0	1	0	0	1	2	0
BLB	1	1	1	1	0	0	0	4	0
BSP	0	0	1	0	0	0	0	1	0
BRS	0	1	0	0	0	0	0	1	0
BUK	0	0	0	1	0	0	0	1	0
CGE/CGT	44	24	15	18	25	28	8	162	9
CLE/CLT	0	1	0	0	2	9	0	12	1
COS/COG	24	46	75	87	97	79	47	455	26
CVT	0	0	1	0	0	0	0	1	0
GIE/GIT	0	0	0	0	0	0	1	1	0
GRE/GRT	15	9	74	67	104	65	23	357	21
IDL	0	2	1	1	0	0	2	6	0
MIL	1	1	0	0	0	0	0	2	0
MIX	2	3	1	1	1	3	0	11	1
OAS	1	1	2	2	0	0	0	6	0
OAT	0	0	0	0	6	0	0	6	0
OTH	0	0	0	1	0	0	2	3	0
PEP	0	1	0	0	0	0	0	1	0
PGE/PGT	4	0	0	2	2	1	3	12	1
PIE/PIT	1	9	1	0	0	4	0	15	1
PLE/PLT	0	0	0	0	1	0	0	1	0
PNE/PNT	1	5	1	2	14	4	2	29	2
POT	24	6	0	1	15	0	0	46	3
RYC	2	0	0	1	0	2	0	5	0
SOF	0	0	0	1	0	0	0	1	0
SOG	0	0	0	0	0	2	0	2	0
SOY	0	0	1	0	27	3	0	31	2
SPF	0	2	0	0	0	0	0	2	0
SPS	0	0	5	0	0	0	0	5	0
SSH	0	0	0	1	0	0	0	1	0
STE	1	0	0	0	0	0	0	1	0

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Current year crop	1995	1996	1997	1998	1999	2000	2001	Total	%
STS	1	0	0	0	0	0	0	1	0
SWC	0	1	1	0	0	1	0	3	0
TRE/TRT	6	6	1	0	4	0	0	17	1
TUR	0	1	0	0	0	0	0	1	0
Unknown	1	1	0	0	1	2	38	43	2
Total	171	187	261	272	379	285	173	1728	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	0	2	0	4	0	0	6
SMG 3 (silt loam)	0	2	3	2	4	0	4	15
SMG 4 (sandy loam)	1	1	2	0	1	3	2	10
SMG 5 (sandy)	3	0	6	2	6	6	2	25
SMG 6 (mucky)	0	0	0	0	0	0	0	0
Total	4	3	13	4	15	9	8	56

3.2 Samples for Commercial Production

Soil series for samples submitted for commercial production:

Name	SMG	1995	1996	1997	1998	1999	2000	2001	Total
Adams	5	2	4	13	9	22	11	49	110
Adjidaumo	1	2	9	3	5	0	3	0	22
Becket	2	6	2	2	0	1	5	0	16
Birdsall	3	0	0	0	0	1	0	0	1
Brayton	4	4	2	2	19	16	22	2	67
Colton	5	5	8	1	2	3	1	2	22
Cook	5	0	0	0	0	2	0	0	2
Coveytown	4	4	6	9	14	25	28	2	88
Covington	1	8	0	14	3	15	24	6	70
Crary	4	2	14	4	0	5	0	0	25
Croghan	5	3	5	4	5	11	13	7	48
Dannemora	4	0	0	0	0	8	1	0	9
Duane	4	0	0	0	0	1	0	0	1
Empeyville	4	33	59	83	67	88	65	23	418
Fahey	5	4	6	4	12	7	19	2	54
Flackville	4	0	2	0	4	0	0	0	6
Grenville	4	5	6	0	2	8	7	6	34
Hailesboro	4	0	4	7	10	1	0	0	22
Hermon	4	5	0	1	25	8	0	2	41
Heuvelton	2	0	5	3	2	0	0	0	10
Hogansburg	4	2	6	4	1	7	6	0	26
Kars	4	1	3	0	0	1	5	1	11
Livingston	1	0	0	6	0	4	1	1	12
Lyman	4	0	0	0	5	0	0	0	5
Madalin	1	0	1	15	16	9	17	24	82
Massena	4	7	5	18	17	14	7	2	70
Moir	4	22	0	0	0	0	0	0	22
Muck	6	0	0	0	0	1	0	0	1
Muskellunge	1	0	7	2	0	0	0	0	9
Naumburg	5	0	4	5	12	3	5	0	29
Nicholville	4	4	1	2	0	11	1	0	19
Panton	1	0	0	0	0	0	1	0	1
Podunk	4	0	0	0	2	0	0	0	2
Rhinebeck	2	0	0	0	0	3	9	10	22
Ridgebury	4	0	0	0	0	1	0	0	1
Saco	3	2	0	0	0	0	0	0	2
Salmon	4	15	3	21	2	11	2	0	54

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Name	SMG	1995	1996	1997	1998	1999	2000	2001	Total
Scarboro	4	1	0	0	1	4	0	0	6
Schroon	5	0	0	0	0	8	0	0	8
Skerry	5	0	0	0	5	3	3	0	11
Sun	4	0	1	0	1	2	1	0	5
Swanton	4	15	0	0	0	8	2	1	26
Trout River	5	6	2	0	4	4	1	1	18
Tughill	4	0	0	4	0	0	0	0	4
Wallington	3	1	1	1	6	2	3	3	17
Walpole	4	1	0	2	7	27	11	6	54
Westbury	4	4	12	12	1	22	4	23	78
Worth	4	0	0	4	5	8	7	0	24
Unknown	-	7	9	15	8	4	0	0	43
Total	-	171	187	261	272	379	285	173	1728

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	0	0	1	0	0	2	4
1996	0	0	0	0	2	0	1	0	3
1997	1	2	3	2	4	0	1	0	13
1998	0	0	0	1	2	0	0	1	4
1999	1	1	5	4	1	1	1	1	15
2000	0	4	1	1	1	0	1	1	9
2001	1	1	0	0	0	3	1	2	8
Total	3	9	9	8	11	4	5	7	56

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1.6	4.0	0.2	3.2	0.2	1.2	0.9	
Highest:	67.6	6.0	6.4	8.1	18.2	8.4	8.9	
Mean:	31.6	4.9	3.2	5.1	4.2	3.5	5.1	
Median:	28.6	4.6	3.3	4.6	3.0	2.8	5.4	

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	100
1996	100
1997	100
1998	100
1999	100
2000	100
2001	100
Total	5	16	16	14	20	7	9	13	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	9	27	46	41	29	12	7	171
1996	0	12	29	60	50	27	6	3	187
1997	0	7	47	62	82	37	16	10	261
1998	3	5	57	107	57	16	11	16	272
1999	0	14	91	137	100	27	5	5	379
2000	0	7	54	88	80	38	13	5	285
2001	0	3	33	61	54	17	5	0	173
Total	3	57	338	561	464	191	68	46	1728

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1.3	1.3	1.1	0.6	1.2	1.1	1.5	
Highest:	10.1	21.9	9.8	28.8	11.2	8.3	6.7	
Mean:	4.2	4.0	4.1	4.1	3.6	4.0	3.9	
Median:	4.1	3.9	4.1	3.7	3.6	3.9	3.7	

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	5	16	27	24	17	7	4	100
1996	0	6	16	32	27	14	3	2	100
1997	0	3	18	24	31	14	6	4	100
1998	0	2	21	40	21	6	4	6	100
1999	0	4	24	36	26	7	1	1	100
2000	0	2	19	31	28	13	5	2	100
2001	0	2	19	35	31	10	3	0	100
Total	0	3	20	33	27	11	4	3	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	0	1	2	0	1	0	0	0	4
1996	0	0	0	0	2	0	1	0	0	0	3
1997	0	0	5	1	2	3	1	1	0	0	13
1998	0	0	1	1	0	1	1	0	0	0	4
1999	0	0	0	1	4	4	5	0	0	0	15
2000	1	0	1	2	2	2	1	0	0	0	9
2001	1	0	0	2	1	1	3	0	0	0	8
Total	2	0	8	8	13	11	13	1	0	0	56

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	5.5	6.2	5.1	5.4	5.5	3.8	3.9	
Highest:	7.2	7.2	7.9	7.0	7.3	7.0	7.3	
Mean:	-	-	-	-	-	-	-	
Median:	6.1	6.4	6.3	6.3	6.6	6.0	6.6	

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	100
1996	100
1997	100
1998	100
1999	100
2000	100
2001	100
Total	4	0	14	14	23	20	23	2	0	0	100

* Due to the low number of samples submitted per year, averages are given over the entire 6 year period.

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	8	31	62	53	16	0	0	0	171
1996	0	0	11	38	61	52	25	0	0	0	187
1997*	0	3	15	46	88	64	22	0	0	0	238
1998*	0	3	14	45	92	89	21	1	0	0	265
1999	0	1	10	76	127	132	29	4	0	0	379
2000	1	2	2	32	90	101	52	4	1	0	285
2001	0	1	6	44	68	47	7	0	0	0	173
Total	1	11	66	312	588	538	172	9	1	0	1698

*23 and 7 samples were not analyzed for the pH in 1997 and in 1998, respectively.

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	4.7	5.0	4.9	4.7	4.9	4.3	4.9	
Highest:	7.4	7.4	7.3	7.9	7.9	8.0	7.2	
Mean:	-	-	-	-	-	-	-	
Median:	6.4	6.3	6.2	6.3	6.4	6.5	6.2	

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	1	5	18	36	31	9	0	0	0	100
1996	0	0	6	20	33	28	13	0	0	0	100
1997	0	1	6	19	37	27	9	0	0	0	100
1998	0	1	5	17	35	34	8	0	0	0	100
1999	0	0	3	20	34	35	8	1	0	0	100
2000	0	1	1	11	32	35	18	1	0	0	100
2001	0	1	3	25	39	27	4	0	0	0	100
Total	0	1	4	18	35	32	10	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	1	0	1	1	0	0	1	0	0	4
1996	0	1	1	0	0	0	0	0	0	1	3
1997	0	4	4	3	0	1	0	0	0	1	13
1998	0	0	1	3	0	0	0	0	0	0	4
1999	0	7	2	4	0	0	0	1	0	1	15
2000	0	5	1	1	2	0	0	0	0	0	9
2001	0	5	1	1	0	0	0	0	0	1	8
Total	0	23	10	13	3	1	0	2	0	4	56

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

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	2	2	1	6	1	1	1	
Highest:	142	369	424	27	872	51	294	
Mean:	51	127	43	13	74	16	40	
Median:	30	8	5	10	4	3	3	

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	100
1996	100
1997	100
1998	100
1999	100
2000	100
2001	100
Total	0	41	18	23	5	2	0	4	0	7	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	52	45	70	2	1	0	1	0	0	171
1996	0	44	63	69	6	4	1	0	0	0	187
1997	0	68	79	108	5	1	0	0	0	0	261
1998	0	57	101	107	4	2	0	0	0	1	272
1999	0	124	137	110	7	1	0	0	0	0	379
2000	0	60	78	127	11	4	3	2	0	0	285
2001	0	42	64	64	3	0	0	0	0	0	173
Total	0	447	567	655	38	13	4	3	0	1	1728

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

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	1	1	1	1	1	1	
Highest:	149	86	72	235	78	128	43	
Mean:	12	12	11	11	9	15	9	
Median:	7	7	7	7	5	9	6	

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	30	26	41	1	1	0	1	0	0	100
1996	0	24	34	37	3	2	1	0	0	0	100
1997	0	26	30	41	2	0	0	0	0	0	100
1998	0	21	37	39	1	1	0	0	0	0	100
1999	0	33	36	29	2	0	0	0	0	0	100
2000	0	21	27	45	4	1	1	1	0	0	100
2001	0	24	37	37	2	0	0	0	0	0	100
Total	0	26	33	38	2	1	0	0	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	1	1	2
1998	0	0	0	0	0	0
1999	0	1	0	1	2	4
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	0	1	0	2	3	6
Total (%)	0	17	0	33	50	100
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	1	1	2
1997	0	1	1	1	0	3
1998	0	0	0	1	1	2
1999	0	1	1	1	1	4
2000	0	0	0	0	0	0
2001	0	1	2	0	1	4
Total (#)	0	3	4	4	4	15
Total (%)	0	20	27	27	27	100

Ketterings, Q.M., H. Krol, W.S. Reid and C. Tillinghast (2003). Franklin County Soil Sample Survey 1995-2001. CSS Extension Bulletin E03-11. 37 pages.

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	total
	Very Low	Low	Medium	High	Very High	
1995	1	0	0	0	0	1
1996	1	0	0	0	0	1
1997	0	1	0	1	0	2
1998	0	0	0	0	0	0
1999	0	0	0	1	0	1
2000	0	1	1	1	0	3
2001	0	0	0	1	1	2
Total (#)	2	2	1	4	1	10
Total (%)	20	20	10	40	10	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	3	0	3
1996	0	0	0	0	0	0
1997	4	1	1	0	0	6
1998	0	0	1	1	0	2
1999	3	2	0	0	1	6
2000	2	2	0	2	0	6
2001	0	0	0	0	2	2
Total (#)	9	5	2	6	3	25
Total (%)	36	20	8	24	12	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 (%)	-	-	-	-	-	-

Number of home and garden samples within each potassium classification:

Summary (#)	Very Low	Low	Medium	High	Very High	Total
1995	1	0	0	3	0	4
1996	1	0	0	1	1	3
1997	4	3	2	3	1	13
1998	0	0	1	2	1	4
1999	3	4	1	3	4	15
2000	2	3	1	3	0	9
2001	0	1	2	1	4	8
Total #	11	11	7	16	11	56

Summary (%)	Very Low	Low	Medium	High	Very High	Total
1995	100
1996	100
1997	100
1998	100
1999	100
2000	100
2001	100
Grand Total	20	20	13	29	20	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	30	21	150	32	26	47	
Highest:	273	394	507	214	4008	201	598	
Mean:	173	203	131	177	382	113	239	
Median:	208	186	111	172	90	93	182	

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	2	8	10
1996	0	0	1	5	11	17
1997	0	2	3	16	19	40
1998	0	0	7	7	10	24
1999	0	1	9	12	6	28
2000	0	0	6	16	24	46
2001	0	5	9	6	11	31
Total (#)	0	8	35	64	89	196
Total (%)	0	4	18	33	45	100
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	1	3	0	1	0	5
1997	0	0	1	0	2	3
1998	0	0	0	0	2	2
1999	0	0	0	2	1	3
2000	1	1	1	2	4	9
2001	0	1	1	5	3	10
Total (#)	2	5	3	10	12	32
Total (%)	6	16	9	31	38	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	1	0	0	1	1	3
1996	0	0	0	2	3	5
1997	0	3	1	1	3	8
1998	1	2	6	4	3	16
1999	0	0	1	2	1	4
2000	0	0	1	0	2	3
2001	0	0	0	2	1	3
Total (#)	2	5	9	12	14	42
Total (%)	5	12	21	29	33	100

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
1995	7	24	20	39	41	131
1996	5	35	25	30	27	122
1997	9	35	54	35	35	168
1998	13	39	40	49	32	173
1999	18	86	82	50	40	276
2000	19	35	45	38	37	174
2001	5	16	17	17	13	68
Total (#)	76	270	283	258	225	1112
Total (%)	7	24	25	23	20	100
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
1995	4	5	2	4	5	20
1996	4	6	6	10	3	29
1997	5	9	4	5	4	27
1998	4	15	12	12	6	49
1999	8	21	14	14	6	63
2000	5	11	11	20	6	53
2001	4	22	12	11	12	61
Total (#)	34	89	61	76	42	302
Total (%)	11	29	20	25	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	1	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	0	1	0	0	0	0
Total (%)	0	100	0	0	0	100

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

Summary (#)	Very Low	Low	Medium	High	Very High	Un-known	Total
1995	12	29	22	46	55	7	171
1996	10	44	32	48	44	9	187
1997	14	49	63	57	63	15	261
1998	18	56	65	72	53	8	272
1999	26	109	106	80	54	4	379
2000	25	47	64	76	73	0	285
2001	9	44	39	41	40	0	173
Grand Total	114	378	391	420	382	43	1728

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

% summary	Very Low	Low	Medium	High	Very High	Un-known	Total
1995	7	17	13	27	32	4	100
1996	5	24	17	26	24	5	100
1997	5	19	24	22	24	6	100
1998	7	21	24	26	19	3	100
1999	7	29	28	21	14	1	100
2000	9	16	22	27	26	0	100
2001	5	25	23	24	23	0	100
Grand Total	7	22	23	24	22	2	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	19	23	22	20	8	37	
Highest:	606	648	703	1113	1091	541	520	
Mean:	193	182	162	163	146	171	169	
Median:	170	147	134	137	118	142	137	

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	0	1	2	4
1996	0	0	0	1	2	3
1997	1	3	0	5	4	13
1998	0	0	0	2	2	4
1999	0	4	0	3	8	15
2000	2	0	2	0	5	9
2001	0	1	1	2	4	8
Total	3	9	3	14	27	56

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	64	113	18	109	33	10	63	
Highest:	616	523	890	1861	1447	479	1594	
Mean:	275	363	203	611	330	243	664	
Median:	209	451	134	238	209	219	496	

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	100
1996	100
1997	100
1998	100
1999	100
2000	100
2001	100
Total	5	16	5	25	48	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	9	7	33	122	171
1996	0	10	7	28	142	187
1997	1	7	7	32	214	261
1998	1	7	7	40	217	272
1999	1	10	11	90	267	379
2000	1	4	2	33	245	285
2001	0	7	11	25	130	173
Total	4	54	52	281	1337	1728

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	20	34	13	12	13	16	42	
Highest:	1830	2141	2003	1713	1970	1974	2154	
Mean:	515	451	502	418	373	516	371	
Median:	390	336	426	361	311	434	316	

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	5	4	19	71	100
1996	0	5	4	15	16	100
1997	0	3	3	12	82	100
1998	0	3	3	15	80	100
1999	0	3	3	24	70	100
2000	0	1	1	12	86	100
2001	0	4	6	14	75	100
Total	0	3	3	16	77	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	4	0	4
1996	3	0	3
1997	13	0	13
1998	4	0	4
1999	14	1	15
2000	7	2	9
2001	5	3	8
Total	50	6	56

Percentages:

	0-49	>49	Total
	Normal	Excessive	
	.	.	100
	.	.	100
	.	.	100
	.	.	100
	.	.	100
	.	.	100
	.	.	100
	.	.	100
	89	11	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	3	4	3	5	1	3	1	
Highest:	9	28	31	38	55	196	238	
Mean:	7	15	13	17	19	42	60	
Median:	7	14	12	12	12	22	27	

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	166	5	171
1996	179	8	187
1997	249	12	261
1998	261	11	272
1999	352	27	379
2000	276	9	285
2001	164	9	173
Total	1647	81	1728

Percentages:

	0-49	>49	Total
	Normal	Excessive	
	97	3	100
	96	4	100
	95	5	100
	96	4	100
	93	7	100
	97	3	100
	95	5	100
	95	5	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1	2	1	1	1	1	3	
Highest:	210	96	389	404	151	267	137	
Mean:	15	14	17	16	19	14	19	
Median:	9	10	9	8	13	9	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:				Percentages:		
	0-99	>99	Total	0-99	>99	Total
	Normal	Excessive		Normal	Excessive	
1995	3	1	4	.	.	100
1996	3	0	3	.	.	100
1997	13	0	13	.	.	100
1998	4	0	4	.	.	100
1999	15	0	15	.	.	100
2000	9	0	9	.	.	100
2001	8	0	8	.	.	100
Total	55	1	56	98	2	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	4	7	6	8	4	3	5	
Highest:	142	47	64	51	86	88	32	
Mean:	63	21	29	27	20	22	16	
Median:	53	8	21	24	11	7	14	

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	171	0	171
1996	187	0	187
1997	259	2	261
1998	268	4	272
1999	377	2	379
2000	281	4	285
2001	173	0	173
Total	1716	12	1728

Percentages:

	0-99	>99	Total
	Normal	Excessive	
	100	0	100
	100	0	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:	4	2	2	3	2	2	3	
Highest:	96	95	147	213	197	355	63	
Mean:	23	24	25	24	24	26	23	
Median:	19	21	21	20	20	22	21	

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	1	3	4
1996	0	1	2	3
1997	0	2	11	13
1998	0	0	4	4
1999	1	3	11	15
2000	0	2	7	9
2001	0	2	6	8
Total	1	11	44	56

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
.	.	.	100
.	.	.	100
.	.	.	100
.	.	.	100
.	.	.	100
.	.	.	100
.	.	.	100
2	20	79	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	0.5	1.1	0.6	2.0	0.1	0.6	0.6	
Highest:	37.0	77.9	56.3	7.9	8.0	25.3	11.6	
Mean:	21.3	50.2	6.6	4.9	2.8	11.0	3.8	
Median:	23.8	71.7	2.2	4.8	3.3	9.1	3.0	

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	24	146	171
1996	1	31	155	187
1997	4	52	205	261
1998	7	59	206	272
1999	4	71	304	379
2000	6	37	242	285
2001	1	11	161	173
Total	24	285	1419	1728

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
1	14	85	100
1	17	83	100
2	20	79	100
3	22	76	100
1	19	80	100
2	13	85	100
1	6	93	100
1	16	82	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	0.4	0.4	0.3	0.1	0.2	0.2	0.4	
Highest:	127.4	38.2	10.5	186.4	710.5	24.1	198.2	
Mean:	4.9	3.1	1.8	3.3	6.9	2.3	4.1	
Median:	2.1	1.8	1.5	1.6	1.8	1.8	2.0	

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/DND	Beans-dry
BLU/BLB	Blueberries
BRS	Broccoli-seeded
CEM	Cemetery
END	Endives
FAR	Fairway
FLA	Flowering annuals
GRA	Grapes
GEN	Green
HRB	Herbs
IDL	Idle land
LAW	Lawn
MIX/MVG	Mixed vegetables
PEP	Peppers
PER	Perennials
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
SPF	Spinach, Fall
SPS	Spinach, Spring
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
TUR	Turnips