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# Soil Sample Survey

# Herkimer Co.

## Samples analyzed by CNAL in 1995-2001

**Summary compiled by**

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

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Summary compiled by

**Quirine Ketterings and Hettie Krol**
Nutrient Management Spear Program
Department of Crop and Soil Sciences
817 Bradfield Hall, Cornell University
Ithaca NY 14853

**W. Shaw Reid**
Professor Emeritus
Department of Crop and Soil Sciences

**Kevin Ganoe**
Field Crops Educator
Central New York Area Dairy, Livestock and Field Crops Program

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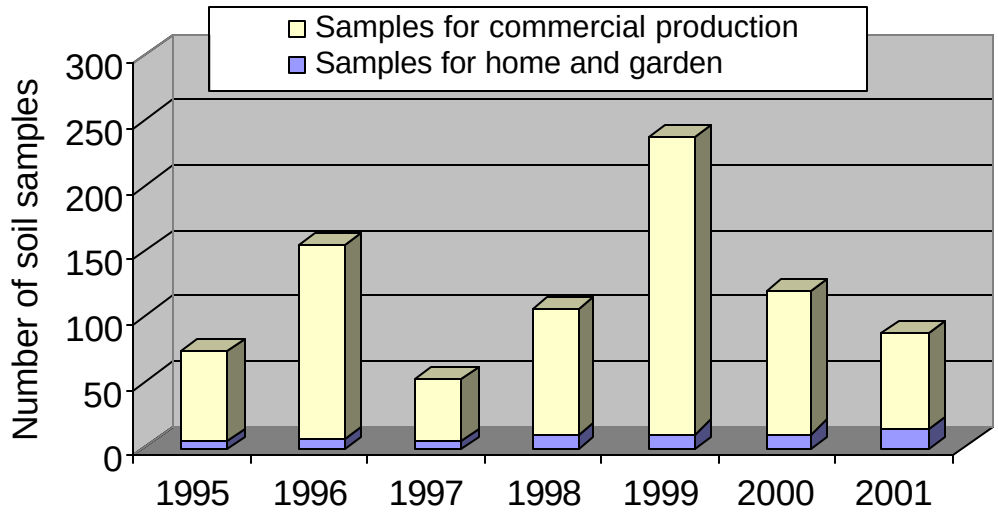
# Table of Content

# 1. General Survey Summary

This survey summarizes the soil test results from Herkimer 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 831. Of these 831 samples, 769 (93%) were submitted to obtain fertilizer recommendations for commercial production while 62 samples (7%) were submitted as home and garden samples.




| Homeowners | | Commercial | | Total |
|---|---|---|---|---|
| 1995 | 5 | 1995 | 68 | 73 |
| 1996 | 7 | 1996 | 148 | 155 |
| 1997 | 5 | 1997 | 47 | 52 |
| 1998 | 10 | 1998 | 96 | 106 |
| 1999 | 11 | 1999 | 226 | 237 |
| 2000 | 11 | 2000 | 110 | 121 |
| 2001 | 13 | 2001 | 74 | 87 |
| Total | 62 | Total | 769 | 831 |

Twenty-nine percent of the home and garden samples were submitted to request fertilizer recommendations for mixed vegetable gardens. Twenty-six percent of the samples came from lawns while a few additional samples were sent in to request recommendations for azaleas, apricots, athletic fields, blueberries, flowering annuals, herbs, perennials, potatoes, and tree fruits. People submitting samples for commercial production requested fertilizer recommendations for alfalfa, alfalfa/grass or alfalfa/trefoil mixtures (39%), corn silage or grain production (35%), or hay (9%), while a few producers were planning on growing other crops including small grains, and pasture land.

Home and garden samples in Herkimer County were silty (19%), silt loams (16%), sandy loams (29%), or sandy (36%), 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, 73% belonged to soil management group 2. None of the samples belonged to group 1 or 6 while 10% was classified group 3, 9% belonged to soil management group 4 and 1% was classified as management group 5.

The remainder was of unknown classification. The five most common soil series, all belonging to soil management group 2, were Mohawk (17%), Honeoye (17%), Manheim (8%), Lima (7%) and Lansing (7%). These soils represent 5% (Mohawk), 12% (Honeoye), 8% (Manheim), 7% (Lima), and 7% (Lansing) of the total 1,411 square miles in the county.

Organic matter levels, as measured by loss on ignition, ranged from 1% to over 11% with median values ranging from 3.5 to 4.9% organic matter for home and garden samples and from 4.0 to 4.6% for samples submitted for commercial production. Fifty-six percent of the home and garden samples had between 2.0 and 4.9% organic matter with 8 samples testing between 2.0 and 2.9% organic matter, 14 between 3.0 and 3.9% organic matter and 13 between 4.0 and 4.9% organic matter. Thirty-one 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, 26% contained between 3.0 and 3.9% organic matter, 43% tested between 4.0 and 4.9% while 18% had organic matter concentrations of 5.0-5.9%. Four percent had less than 3.0% organic matter while 9% of the samples had 6.0% or more organic matter. In total, 67% of the samples had organic matter levels between 4.0 and 6.9%.

Soil pH in water (1:1 extraction ratio) varied from pH 4.1 to 8.2 with the median for home and garden samples ranging from pH 6.9 to pH 7.6 and for samples submitted for commercial production ranging from pH 6.0 to pH 6.8. Of the home and garden samples, 47% tested between pH 6.0 and 7.4. For the samples submitted for commercial production, this was 78% while 17% 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, 18% tested low, 10% tested medium, 40% tested high and 32% tested very high. This meant that 73% tested high or very high in P. Of the samples submitted

for commercial production, 34% tested low in P. Twenty-nine percent were medium in P, 31% tested high while 6% of the samples were very high in P. This means that 36% 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, 19% was classified as very low or low in potassium. Twenty-one percent tested medium, another 21% were high and 39% were very high in potassium. For samples submitted for commercial production, 2% were very low in K, 6% tested low, 18% tested medium, 28% tested high and 40% 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 6 to slightly over 1000 lbs Mg/acre (Morgan extraction). There were only 3 samples 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 (92% of the homeowner soils and 94% of the soils of the commercial growers). Four of the home and garden samples and 42 (5%) of the commercial growers' soils tested low or medium in Mg. Thus, magnesium deficiency is not likely to occur in Herkimer 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-two percent of the home and garden samples were classified as normal in Fe while 96% of the commercial samples tested in the normal range for Fe. Similarly, almost all soils with the exception of 1 commercial sample and 4 home and garden samples tested normal for manganese. Soils with more than 100 lbs Morgan extractable Mn per acre are classified as excessive in Mn. Anything less than 100 lbs Mn per acre is classified as normal. Soils with less than 0.5 lb 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, one sample tested low for zinc while 9 tested medium and 52 tested high for zinc. Of the samples for commercial production, 8% tested low in zinc, 33% tested medium while 59% 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 | % |
|---|---|---|---|---|---|---|---|---|---|
| ALG | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| APR | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 |
| ATF | 2 | 0 | 0 | 2 | 1 | 4 | 2 | 11 | 18 |
| BLU | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 3 |
| FLA | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 3 |
| HRB | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| LAW | 0 | 4 | 0 | 0 | 6 | 4 | 2 | 16 | 26 |
| MVG | 3 | 1 | 3 | 6 | 1 | 0 | 4 | 18 | 29 |
| OTH | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| PER | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 7 | 11 |
| PTO | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| TRF | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| | | | | | | | | | |
| Total | 5 | 7 | 5 | 10 | 11 | 11 | 13 | 62 | 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 | 3 | 10 | 6 | 2 | 0 | 4 | 2 | 27 | 4 |
| AGE/AGT | 32 | 41 | 4 | 25 | 105 | 21 | 20 | 248 | 32 |
| ALE/ALT | 0 | 8 | 1 | 4 | 11 | 2 | 0 | 26 | 3 |
| ALG | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| APP | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 |
| BGE/BGT | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| BLB | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| BNS | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| BSP | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 5 | 1 |
| BUK | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 1 |
| CGE/CGT | 2 | 2 | 7 | 4 | 2 | 2 | 2 | 21 | 3 |
| CKS | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| CLE/CLT | 7 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 1 |
| COG/COS | 13 | 72 | 10 | 28 | 74 | 52 | 20 | 269 | 35 |
| GIE/GIT | 0 | 0 | 0 | 2 | 6 | 0 | 11 | 19 | 2 |
| GRE/GRT | 0 | 1 | 9 | 15 | 8 | 17 | 7 | 57 | 7 |
| IDL | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| MIX | 2 | 0 | 1 | 0 | 0 | 1 | 1 | 5 | 1 |
| MML | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| OAS | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 5 | 1 |
| OAT | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 0 |
| ONS | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| OTH | 0 | 0 | 3 | 4 | 1 | 1 | 0 | 9 | 1 |
| PEA | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| PGE/PGT | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 6 | 1 |
| PIE/PIT | 1 | 3 | 2 | 3 | 8 | 5 | 2 | 24 | 3 |
| PLE/PLT | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| PNE/PNT | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 4 | 1 |
| POT | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| PUM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| RYC | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| SOY | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| SWC | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 |
| TOM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| TRE/TRT | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 |

| Current year crop | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Total | % |
|---|---|---|---|---|---|---|---|---|---|
| Unknown | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| | | | | | | | | | |
| Total | 68 | 148 | 47 | 96 | 226 | 110 | 74 | 769 | 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) | 1 | 1 | 1 | 1 | 1 | 2 | 5 | 12 |
| SMG 3 (silt loam) | 1 | 1 | 0 | 5 | 2 | 0 | 1 | 10 |
| SMG 4 (sandy loam) | 1 | 1 | 2 | 3 | 4 | 5 | 2 | 18 |
| SMG 5 (sandy) | 2 | 4 | 2 | 1 | 4 | 4 | 5 | 22 |
| SMG 6 (mucky) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 5 | 7 | 5 | 10 | 11 | 11 | 13 | 62 |

## *3.2 Samples for Commercial Production*

Soil series for samples submitted for commercial production:

| Name | SMG | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Appleton | 2 | 0 | 0 | 0 | 4 | 17 | 2 | 1 | 24 |
| Broadalbin | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 5 |
| Burdett | 2 | 1 | 3 | 0 | 4 | 1 | 0 | 0 | 9 |
| Conesus | 2 | 0 | 4 | 1 | 1 | 7 | 5 | 3 | 21 |
| Farmington | 3 | 0 | 1 | 0 | 3 | 5 | 1 | 0 | 10 |
| Fredon | 4 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 3 |
| Halsey | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Hamlin | 2 | 0 | 3 | 0 | 7 | 0 | 4 | 4 | 18 |
| Hartland | 4 | 3 | 1 | 0 | 1 | 0 | 0 | 1 | 6 |
| Herkimer | 3 | 2 | 3 | 0 | 2 | 5 | 1 | 0 | 13 |
| Hilton | 2 | 2 | 1 | 0 | 0 | 6 | 6 | 0 | 15 |
| Hinckley | 5 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 6 |
| Honeoye | 2 | 28 | 11 | 0 | 28 | 46 | 3 | 13 | 129 |
| Hornell | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| Howard | 3 | 2 | 11 | 0 | 2 | 6 | 2 | 6 | 29 |
| Hudson | 2 | 0 | 1 | 3 | 2 | 1 | 1 | 0 | 8 |
| Ilion | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Lairdsville | 2 | 0 | 2 | 1 | 0 | 1 | 2 | 0 | 6 |
| Lansing | 2 | 1 | 10 | 8 | 3 | 12 | 10 | 10 | 54 |
| Lima | 2 | 3 | 3 | 0 | 8 | 38 | 0 | 5 | 57 |
| Lockport | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| Lyons | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Manheim | 2 | 5 | 16 | 1 | 6 | 5 | 25 | 6 | 64 |
| Manlius | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 4 |
| Massena | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Mohawk | 2 | 3 | 48 | 4 | 6 | 37 | 28 | 6 | 132 |
| Mosherville | 4 | 0 | 5 | 0 | 1 | 0 | 0 | 1 | 7 |
| Nassau | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Ontario | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 3 |
| Palatine | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Palms | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Palmyra | 3 | 3 | 4 | 0 | 2 | 6 | 0 | 1 | 16 |
| Phelps | 3 | 1 | 2 | 0 | 0 | 1 | 0 | 1 | 5 |
| Rhinebeck | 2 | 1 | 3 | 0 | 1 | 4 | 0 | 0 | 9 |
| Teel | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 5 |
| Wassaic | 4 | 4 | 4 | 3 | 5 | 13 | 5 | 8 | 42 |

| Name | SMG | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Wayland | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Williamson | 4 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| Windsor | 5 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| Unknown | - | 7 | 10 | 12 | 4 | 7 | 9 | 1 | 50 |
| | | | | | | | | | |
| Total | - | 68 | 148 | 47 | 96 | 226 | 110 | 74 | 769 |

# 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 | 0 | 3 | 0 | 0 | 2 | 0 | 5 |
| 1996 | 0 | 3 | 0 | 1 | 2 | 1 | 0 | 0 | 7 |
| 1997 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 5 |
| 1998 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 10 |
| 1999 | 0 | 2 | 0 | 4 | 2 | 2 | 0 | 1 | 11 |
| 2000 | 0 | 0 | 4 | 2 | 2 | 2 | 0 | 1 | 11 |
| 2001 | 2 | 0 | 2 | 1 | 4 | 2 | 1 | 1 | 13 |
| Total | 2 | 6 | 8 | 14 | 13 | 9 | 6 | 4 | 62 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 3.3 | 1.0 | 2.9 | 1.4 | 1.0 | 2.0 | 0.5 | |
| Highest: | 6.4 | 5.5 | 6.8 | 10.0 | 7.4 | 7.9 | 10.0 | |
| Mean: | 4.6 | 3.3 | 4.3 | 4.8 | 4.0 | 4.0 | 4.4 | |
| Median: | 3.5 | 3.6 | 3.7 | 4.8 | 3.8 | 3.8 | 4.9 | |

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 | . | . | . | . | . | . | . | . | 100 |
| 1996 | . | . | . | . | . | . | . | . | 100 |
| 1997 | . | . | . | . | . | . | . | . | 100 |
| 1998 | . | . | . | . | . | . | . | . | 100 |
| 1999 | . | . | . | . | . | . | . | . | 100 |
| 2000 | . | . | . | . | . | . | . | . | 100 |
| 2001 | . | . | . | . | . | . | . | . | 100 |
| Total | 3 | 10 | 13 | 23 | 21 | 15 | 10 | 6 | 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 | 0 | 4 | 12 | 25 | 17 | 4 | 6 | 68 |
| 1996 | 0 | 0 | 5 | 64 | 56 | 18 | 5 | 0 | 148 |
| 1997 | 0 | 0 | 1 | 10 | 19 | 11 | 3 | 3 | 47 |
| 1998 | 0 | 1 | 6 | 21 | 37 | 16 | 9 | 6 | 96 |
| 1999 | 0 | 0 | 1 | 54 | 121 | 37 | 11 | 2 | 226 |
| 2000 | 0 | 1 | 2 | 31 | 48 | 21 | 4 | 3 | 110 |
| 2001 | 0 | 1 | 9 | 8 | 25 | 16 | 14 | 1 | 74 |
| Total | 0 | 3 | 28 | 200 | 331 | 136 | 50 | 21 | 769 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 2.3 | 2.2 | 2.8 | 1.6 | 2.3 | 1.9 | 1.9 | |
| Highest: | 11.1 | 7.0 | 8.9 | 10.0 | 9.5 | 8.1 | 7.9 | |
| Mean: | 4.9 | 4.2 | 4.7 | 4.6 | 4.5 | 4.4 | 4.6 | |
| Median: | 4.5 | 4.0 | 4.4 | 4.4 | 4.4 | 4.3 | 4.6 | |

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 | 0 | 6 | 18 | 37 | 25 | 6 | 9 | 100 |
| 1996 | 0 | 0 | 3 | 43 | 38 | 12 | 3 | 0 | 100 |
| 1997 | 0 | 0 | 2 | 21 | 40 | 23 | 6 | 6 | 100 |
| 1998 | 0 | 1 | 6 | 22 | 39 | 17 | 9 | 6 | 100 |
| 1999 | 0 | 0 | 0 | 24 | 54 | 16 | 5 | 1 | 100 |
| 2000 | 0 | 1 | 2 | 28 | 44 | 19 | 4 | 3 | 100 |
| 2001 | 0 | 1 | 12 | 11 | 34 | 22 | 19 | 1 | 100 |
| Total | 0 | 0 | 4 | 26 | 43 | 18 | 7 | 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 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | |
| 1996 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 0 | 0 | |
| 1997 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | |
| 1998 | 0 | 1 | 0 | 0 | 0 | 3 | 1 | 5 | 0 | 0 | |
| 1999 | 0 | 0 | 1 | 1 | 0 | 0 | 3 | 5 | 1 | 0 | |
| 2000 | 0 | 1 | 0 | 0 | 1 | 0 | 4 | 4 | 1 | 0 | |
| 2001 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 4 | 2 | 0 | |
| Total | 0 | 2 | 3 | 3 | 4 | 8 | 17 | 21 | 4 | 0 | |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 6.4 | 6.7 | 5.2 | 4.6 | 5.4 | 4.8 | 5.0 | |
| Highest: | 7.6 | 7.8 | 7.2 | 7.9 | 8.2 | 8.1 | 8.1 | |
| Mean: | - | - | - | - | - | - | - | |
| Median: | 7.2 | 7.2 | 6.9 | 7.4 | 7.6 | 7.3 | 7.4 | |

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 | 0 | 3 | 5 | 5 | 6 | 13 | 27 | 34 | 6 | 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 | 3 | 5 | 8 | 13 | 23 | 14 | 2 | 0 | 0 | 68 |
| 1996 | 0 | 0 | 6 | 26 | 65 | 40 | 11 | 0 | 0 | 0 | 148 |
| 1997 | 2 | 2 | 7 | 12 | 18 | 5 | 1 | 0 | 0 | 0 | 47 |
| 1998 | 0 | 0 | 7 | 17 | 29 | 33 | 9 | 1 | 0 | 0 | 96 |
| 1999 | 1 | 4 | 6 | 17 | 36 | 85 | 63 | 14 | 0 | 0 | 226 |
| 2000 | 0 | 0 | 3 | 8 | 26 | 52 | 17 | 4 | 0 | 0 | 110 |
| 2001 | 0 | 0 | 0 | 11 | 20 | 25 | 17 | 0 | 1 | 0 | 74 |
| Total | 3 | 9 | 34 | 99 | 207 | 263 | 132 | 21 | 1 | 0 | 769 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 4.8 | 5.1 | 4.1 | 5.0 | 4.3 | 5.1 | 5.5 | |
| Highest: | 7.7 | 7.2 | 7.0 | 7.7 | 7.8 | 7.6 | 8.0 | |
| Mean: | - | - | - | - | - | - | - | |
| Median: | 6.6 | 6.3 | 6.0 | 6.3 | 6.8 | 6.6 | 6.6 | |

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 | 4 | 7 | 12 | 19 | 34 | 21 | 3 | 0 | 0 | 100 |
| 1996 | 0 | 0 | 4 | 18 | 44 | 27 | 7 | 0 | 0 | 0 | 100 |
| 1997 | 4 | 4 | 15 | 26 | 38 | 11 | 2 | 0 | 0 | 0 | 100 |
| 1998 | 0 | 0 | 7 | 18 | 30 | 34 | 9 | 1 | 0 | 0 | 100 |
| 1999 | 0 | 2 | 3 | 8 | 16 | 38 | 28 | 6 | 0 | 0 | 100 |
| 2000 | 0 | 0 | 3 | 7 | 24 | 47 | 15 | 4 | 0 | 0 | 100 |
| 2001 | 0 | 0 | 0 | 15 | 27 | 34 | 23 | 0 | 1 | 0 | 100 |
| Total | 0 | 1 | 4 | 13 | 27 | 34 | 17 | 3 | 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 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 |
| 1996 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 2 | 7 |
| 1997 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 5 |
| 1998 | 0 | 0 | 1 | 4 | 3 | 0 | 2 | 0 | 0 | 0 | 10 |
| 1999 | 0 | 2 | 2 | 4 | 1 | 0 | 2 | 0 | 0 | 0 | 11 |
| 2000 | 0 | 3 | 0 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 11 |
| 2001 | 0 | 2 | 2 | 5 | 2 | 0 | 1 | 1 | 0 | 0 | 13 |
| Total | 0 | 11 | 6 | 25 | 8 | 1 | 5 | 2 | 0 | 4 | 62 |

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

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 1 | 16 | 3 | 8 | 1 | 1 | 1 | |
| Highest: | 196 | 280 | 65 | 99 | 89 | 48 | 143 | |
| Mean: | 79 | 108 | 26 | 42 | 28 | 17 | 35 | |
| Median: | 2 | 48 | 24 | 43 | 20 | 12 | 26 | |

P1ercent 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 | 18 | 10 | 40 | 13 | 2 | 8 | 3 | 0 | 6 | 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 | 23 | 14 | 25 | 5 | 1 | 0 | 0 | 0 | 0 | 68 |
| 1996 | 0 | 52 | 38 | 49 | 3 | 5 | 0 | 0 | 1 | 0 | 148 |
| 1997 | 0 | 19 | 15 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 47 |
| 1998 | 0 | 23 | 28 | 40 | 1 | 2 | 1 | 0 | 0 | 1 | 96 |
| 1999 | 0 | 76 | 86 | 60 | 2 | 2 | 0 | 0 | 0 | 0 | 226 |
| 2000 | 0 | 49 | 24 | 27 | 4 | 1 | 1 | 3 | 1 | 0 | 110 |
| 2001 | 0 | 22 | 20 | 22 | 3 | 4 | 1 | 0 | 1 | 1 | 74 |
| Total | 0 | 264 | 225 | 235 | 19 | 15 | 3 | 3 | 3 | 2 | 769 |

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: | 67 | 158 | 45 | 241 | 65 | 178 | 266 | |
| Mean: | 14 | 13 | 7 | 15 | 8 | 15 | 20 | |
| Median: | 7 | 6 | 5 | 7 | 5 | 4 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | VL | L | M | H | VH | VH | VH | VH | VH | VH | |
| 1995 | 0 | 34 | 21 | 37 | 7 | 1 | 0 | 0 | 0 | 0 | 100 |
| 1996 | 0 | 35 | 26 | 33 | 2 | 3 | 0 | 0 | 1 | 0 | 100 |
| 1997 | 0 | 40 | 32 | 26 | 2 | 0 | 0 | 0 | 0 | 0 | 100 |
| 1998 | 0 | 24 | 29 | 42 | 1 | 2 | 1 | 0 | 0 | 1 | 100 |
| 1999 | 0 | 34 | 38 | 27 | 1 | 1 | 0 | 0 | 0 | 0 | 100 |
| 2000 | 0 | 45 | 22 | 25 | 4 | 1 | 1 | 3 | 1 | 0 | 100 |
| 2001 | 0 | 30 | 27 | 30 | 4 | 5 | 1 | 0 | 1 | 1 | 100 |
| Total | 0 | 34 | 29 | 31 | 2 | 2 | 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 | 1 | 0 | 1 |
| 1996 | 0 | 0 | 0 | 0 | 1 | 1 |
| 1997 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1998 | 0 | 0 | 0 | 0 | 1 | 1 |
| 1999 | 0 | 0 | 0 | 0 | 1 | 1 |
| 2000 | 0 | 0 | 1 | 0 | 1 | 2 |
| 2001 | 0 | 0 | 0 | 1 | 4 | 5 |
| Total (#) | 0 | 0 | 1 | 3 | 8 | 12 |
| Total (%) | 0 | 0 | 8 | 25 | 67 | 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 | 0 | 0 | 1 |
| 1996 | 0 | 0 | 0 | 0 | 1 | 1 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1998 | 0 | 0 | 0 | 2 | 3 | 5 |
| 1999 | 1 | 0 | 0 | 1 | 0 | 2 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total (#) | 1 | 0 | 1 | 3 | 5 | 10 |
| Total (%) | 10 | 0 | 10 | 30 | 50 | 100 |

| Soil Management Group 4 | | | | | | |
|---|---|---|---|---|---|---|
| | <55 | 55-99 | 100-149 | 150-239 | >239 | Total |
| | Very Low | Low | Medium | High | Very High | |
| 1995 | 0 | 1 | 0 | 0 | 0 | 1 |
| 1996 | 0 | 0 | 0 | 0 | 1 | 1 |
| 1997 | 0 | 0 | 2 | 0 | 0 | 2 |
| 1998 | 0 | 0 | 1 | 1 | 1 | 3 |
| 1999 | 0 | 0 | 0 | 1 | 3 | 4 |
| 2000 | 0 | 1 | 2 | 1 | 1 | 5 |
| 2001 | 0 | 0 | 0 | 1 | 1 | 2 |
| Total (#) | 0 | 2 | 5 | 4 | 7 | 18 |
| Total (%) | 0 | 11 | 28 | 22 | 39 | 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 | 2 | 2 |
| 1996 | 0 | 1 | 2 | 0 | 1 | 4 |
| 1997 | 0 | 1 | 0 | 1 | 0 | 2 |
| 1998 | 0 | 0 | 1 | 0 | 0 | 1 |
| 1999 | 0 | 1 | 1 | 1 | 1 | 4 |
| 2000 | 1 | 3 | 0 | 0 | 0 | 4 |
| 2001 | 1 | 1 | 2 | 1 | 0 | 5 |
| Total (#) | 2 | 7 | 6 | 3 | 4 | 22 |
| Total (%) | 9 | 32 | 27 | 14 | 18 | 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 | 0 | 1 | 1 | 1 | 2 | 5 |
| 1996 | 0 | 1 | 2 | 0 | 4 | 7 |
| 1997 | 0 | 1 | 2 | 2 | 0 | 5 |
| 1998 | 0 | 0 | 2 | 3 | 5 | 10 |
| 1999 | 1 | 1 | 1 | 3 | 5 | 11 |
| 2000 | 1 | 4 | 3 | 1 | 2 | 11 |
| 2001 | 1 | 1 | 2 | 3 | 6 | 13 |
| Total # | 3 | 9 | 13 | 13 | 24 | 62 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 92 | 112 | 60 | 127 | 11 | 24 | 28 | |
| Highest: | 652 | 1002 | 171 | 556 | 579 | 276 | 1064 | |
| Mean: | 269 | 352 | 126 | 308 | 255 | 129 | 260 | |
| Median: | 111 | 247 | 142 | 253 | 222 | 109 | 182 | |

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

| Summary (%) | Very Low | Low | Medium | High | Very High | Total |
|---|---|---|---|---|---|---|
| 1995 | 0 | 20 | 20 | 20 | 40 | 100 |
| 1996 | 0 | 14 | 29 | 0 | 57 | 100 |
| 1997 | 0 | 20 | 40 | 40 | 0 | 100 |
| 1998 | 0 | 0 | 20 | 30 | 50 | 100 |
| 1999 | 9 | 9 | 9 | 27 | 45 | 100 |
| 2000 | 9 | 36 | 27 | 9 | 18 | 100 |
| 2001 | 8 | 8 | 15 | 23 | 46 | 100 |
| Grand Total | 5 | 15 | 21 | 21 | 39 | 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 | 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 | 5 | 12 | 28 | 45 |
| 1996 | 0 | 7 | 31 | 28 | 39 | 105 |
| 1997 | 1 | 1 | 6 | 6 | 8 | 22 |
| 1998 | 0 | 1 | 10 | 22 | 39 | 72 |
| 1999 | 9 | 10 | 34 | 53 | 73 | 179 |
| 2000 | 0 | 1 | 18 | 33 | 39 | 91 |
| 2001 | 0 | 5 | 4 | 18 | 23 | 50 |
| Total (#) | 10 | 25 | 108 | 172 | 249 | 564 |
| Total (%) | 2 | 4 | 19 | 30 | 44 | 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 | 3 | 4 | 8 |
| 1996 | 0 | 1 | 4 | 5 | 12 | 22 |
| 1997 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1998 | 0 | 0 | 0 | 5 | 4 | 9 |
| 1999 | 0 | 8 | 3 | 7 | 6 | 24 |
| 2000 | 0 | 0 | 1 | 1 | 3 | 5 |
| 2001 | 0 | 0 | 9 | 3 | 5 | 8 |
| Total (#) | 0 | 9 | 18 | 25 | 34 | 86 |
| Total (%) | 0 | 10 | 21 | 29 | 40 | 100 |

| Soil Management Group 4 | | | | | | |
|---|---|---|---|---|---|---|
| | <55 | 55-99 | 100-149 | 150-239 | >239 | Total |
| | Very Low | Low | Medium | High | Very High | |
| 1995 | 0 | 1 | 3 | 2 | 2 | 8 |
| 1996 | 2 | 2 | 5 | 0 | 1 | 10 |
| 1997 | 0 | 0 | 2 | 4 | 2 | 8 |
| 1998 | 0 | 1 | 4 | 1 | 3 | 9 |
| 1999 | 0 | 5 | 2 | 4 | 5 | 16 |
| 2000 | 0 | 1 | 0 | 3 | 1 | 5 |
| 2001 | 2 | 0 | 2 | 3 | 5 | 12 |
| Total (#) | 4 | 10 | 18 | 17 | 19 | 68 |
| Total (%) | 6 | 15 | 26 | 25 | 28 | 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 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1997 | 2 | 1 | 0 | 0 | 0 | 3 |
| 1998 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 0 | 3 | 0 | 0 | 0 | 3 |
| Total (#) | 2 | 4 | 0 | 2 | 0 | 8 |
| Total (%) | 25 | 50 | 0 | 25 | 0 | 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 | 1 | 1 |
| 1999 | 0 | 0 | 0 | 0 | 1 | 1 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total (#) | 0 | 0 | 0 | 0 | 2 | 2 |
| Total (%) | 0 | 0 | 0 | 0 | 100 | 100 |

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

| Summary (#) | Very Low | Low | Medium | High | Very High | Un-known | Total |
|---|---|---|---|---|---|---|---|
| 1995 | 0 | 1 | 9 | 17 | 34 | 7 | 68 |
| 1996 | 2 | 10 | 40 | 34 | 52 | 10 | 148 |
| 1997 | 3 | 2 | 8 | 11 | 11 | 12 | 47 |
| 1998 | 0 | 2 | 14 | 29 | 47 | 4 | 96 |
| 1999 | 9 | 23 | 39 | 64 | 84 | 7 | 226 |
| 2000 | 0 | 2 | 19 | 37 | 43 | 9 | 110 |
| 2001 | 2 | 8 | 6 | 24 | 33 | 1 | 74 |
| Grand Total | 16 | 48 | 135 | 216 | 304 | 50 | 769 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 36 | 41 | 20 | 59 | 7 | 65 | 50 | |
| Highest: | 615 | 1026 | 401 | 809 | 587 | 953 | 679 | |
| Mean: | 217 | 182 | 147 | 248 | 161 | 198 | 218 | |
| Median: | 176 | 125 | 120 | 165 | 135 | 136 | 167 | |

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

| % summary | Very Low | Low | Medium | High | Very High | Un-known | Total |
|---|---|---|---|---|---|---|---|
| 1995 | 0 | 1 | 13 | 25 | 50 | 10 | 100 |
| 1996 | 1 | 7 | 27 | 23 | 35 | 7 | 100 |
| 1997 | 6 | 4 | 17 | 23 | 23 | 26 | 100 |
| 1998 | 0 | 2 | 15 | 30 | 49 | 4 | 100 |
| 1999 | 4 | 10 | 17 | 28 | 37 | 3 | 100 |
| 2000 | 0 | 2 | 17 | 34 | 39 | 8 | 100 |
| 2001 | 3 | 11 | 8 | 32 | 45 | 1 | 100 |
| Grand Total | 2 | 6 | 18 | 28 | 40 | 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 | 0 | 0 | 0 | 5 | 5 |
| 1996 | 0 | 0 | 2 | 0 | 5 | 7 |
| 1997 | 0 | 0 | 0 | 3 | 2 | 5 |
| 1998 | 0 | 0 | 0 | 1 | 9 | 10 |
| 1999 | 0 | 0 | 1 | 2 | 8 | 11 |
| 2000 | 1 | 0 | 0 | 2 | 8 | 11 |
| 2001 | 0 | 1 | 0 | 2 | 10 | 13 |
| Total | 1 | 1 | 3 | 10 | 47 | 62 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 283 | 103 | 175 | 126 | 92 | 16 | 28 | |
| Highest: | 669 | 757 | 536 | 587 | 530 | 595 | 525 | |
| Mean: | 495 | 401 | 262 | 397 | 312 | 275 | 312 | |
| Median: | 592 | 386 | 199 | 406 | 301 | 267 | 281 | |

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 | 2 | 2 | 5 | 16 | 76 | 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 | 1 | 5 | 5 | 19 | 38 | 68 |
| 1996 | 0 | 1 | 2 | 22 | 123 | 148 |
| 1997 | 0 | 3 | 2 | 5 | 37 | 47 |
| 1998 | 0 | 0 | 2 | 21 | 73 | 96 |
| 1999 | 1 | 5 | 9 | 39 | 172 | 226 |
| 2000 | 0 | 4 | 2 | 10 | 94 | 110 |
| 2001 | 0 | 0 | 2 | 17 | 55 | 74 |
| Total | 2 | 18 | 24 | 133 | 592 | 769 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 18 | 56 | 30 | 89 | 6 | 39 | 82 | |
| Highest: | 827 | 1038 | 800 | 851 | 919 | 808 | 761 | |
| Mean: | 262 | 342 | 340 | 317 | 312 | 397 | 312 | |
| Median: | 239 | 314 | 285 | 295 | 295 | 383 | 303 | |

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 | 1 | 7 | 7 | 28 | 56 | 100 |
| 1996 | 0 | 1 | 1 | 15 | 83 | 100 |
| 1997 | 0 | 6 | 4 | 11 | 79 | 100 |
| 1998 | 0 | 0 | 2 | 22 | 76 | 100 |
| 1999 | 0 | 2 | 4 | 17 | 76 | 100 |
| 2000 | 0 | 4 | 2 | 9 | 85 | 100 |
| 2001 | 0 | 0 | 3 | 23 | 74 | 100 |
| Total | 0 | 2 | 3 | 17 | 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 | 5 | 0 | 5 |
| 1996 | 7 | 0 | 7 |
| 1997 | 5 | 0 | 5 |
| 1998 | 7 | 3 | 10 |
| 1999 | 10 | 1 | 11 |
| 2000 | 10 | 1 | 11 |
| 2001 | 13 | 0 | 13 |
| Total | 57 | 5 | 62 |

Percentages:

| 0-49 | >49 | Total |
|---|---|---|
| Normal | Excessive | |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| 92 | 8 | 100 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 4 | 2 | 3 | 2 | 2 | 2 | 2 | |
| Highest: | 9 | 18 | 23 | 191 | 85 | 53 | 36 | |
| Mean: | 6 | 8 | 10 | 45 | 16 | 11 | 10 | |
| Median: | 5 | 4 | 6 | 10 | 7 | 5 | 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 | 59 | 9 | 68 |
| 1996 | 146 | 2 | 148 |
| 1997 | 44 | 3 | 47 |
| 1998 | 93 | 3 | 96 |
| 1999 | 216 | 10 | 226 |
| 2000 | 110 | 0 | 110 |
| 2001 | 74 | 0 | 74 |
| Total | 742 | 27 | 769 |

Percentages:

| 0-49 | >49 | Total |
|---|---|---|
| Normal | Excessive | |
| 87 | 13 | 100 |
| 99 | 1 | 100 |
| 94 | 6 | 100 |
| 97 | 3 | 100 |
| 96 | 4 | 100 |
| 100 | 0 | 100 |
| 100 | 0 | 100 |
| 96 | 4 | 100 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Highest: | 411 | 129 | 286 | 124 | 252 | 49 | 37 | |
| Mean: | 29 | 9 | 24 | 11 | 11 | 10 | 7 | |
| Median: | 5 | 6 | 12 | 8 | 5 | 6 | 5 | |

# 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 | 5 | 0 | 5 |
| 1996 | 6 | 1 | 7 |
| 1997 | 5 | 0 | 5 |
| 1998 | 8 | 2 | 10 |
| 1999 | 10 | 1 | 11 |
| 2000 | 11 | 0 | 11 |
| 2001 | 13 | 0 | 13 |
| Total | 58 | 4 | 62 |

Percentages:

| 0-99 | >99 | Total |
|---|---|---|
| Normal | Excessive | |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| . | . | 100 |
| 94 | 6 | 100 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 30 | 25 | 15 | 14 | 12 | 3 | 10 | |
| Highest: | 58 | 119 | 52 | 138 | 152 | 87 | 86 | |
| Mean: | 48 | 44 | 31 | 51 | 44 | 36 | 43 | |
| Median: | 53 | 31 | 32 | 39 | 31 | 29 | 44 | |

## *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 | 60 | 8 | 68 |
| 1996 | 147 | 1 | 148 |
| 1997 | 47 | 0 | 47 |
| 1998 | 95 | 1 | 96 |
| 1999 | 226 | 0 | 226 |
| 2000 | 109 | 1 | 110 |
| 2001 | 74 | 0 | 74 |
| Total | 758 | 11 | 769 |

Percentages:

| 0-99 | >99 | Total |
|---|---|---|
| Normal | Excessive | |
| 88 | 12 | 100 |
| 99 | 1 | 100 |
| 100 | 0 | 100 |
| 99 | 1 | 100 |
| 100 | 0 | 100 |
| 99 | 1 | 100 |
| 100 | 0 | 100 |
| 99 | 1 | 100 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 9 | 7 | 8 | 10 | 2 | 10 | 8 | |
| Highest: | 223 | 168 | 84 | 173 | 83 | 180 | 76 | |
| Mean: | 44 | 29 | 36 | 34 | 28 | 31 | 34 | |
| Median: | 28 | 26 | 33 | 30 | 27 | 29 | 33 | |

# 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 | 0 | 5 | 5 |
| 1996 | 0 | 2 | 5 | 7 |
| 1997 | 0 | 0 | 5 | 5 |
| 1998 | 0 | 1 | 9 | 10 |
| 1999 | 0 | 1 | 10 | 11 |
| 2000 | 1 | 2 | 8 | 11 |
| 2001 | 0 | 3 | 10 | 13 |
| Total | 1 | 9 | 52 | 62 |

Percentages:

| <0.5 | 0.5-1.0 | >1 | Total |
|---|---|---|---|
| Low | Medium | High | |
| . | . | . | 100 |
| . | . | . | 100 |
| . | . | . | 100 |
| . | . | . | 100 |
| . | . | . | 100 |
| . | . | . | 100 |
| . | . | . | 100 |
| 2 | 15 | 84 | 100 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 1.3 | 0.5 | 1.8 | 0.7 | 1.0 | 0.3 | 0.5 | |
| Highest: | 7.9 | 20.1 | 13.4 | 16.8 | 47.9 | 115.4 | 31.3 | |
| Mean: | 3.7 | 8.3 | 6.0 | 6.8 | 7.1 | 13.2 | 6.4 | |
| Median: | 1.9 | 8.5 | 2.5 | 5.3 | 2.2 | 2.5 | 2.9 | |

## *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 | 2 | 13 | 53 | 68 |
| 1996 | 8 | 59 | 81 | 148 |
| 1997 | 0 | 8 | 39 | 47 |
| 1998 | 5 | 31 | 60 | 96 |
| 1999 | 35 | 96 | 95 | 226 |
| 2000 | 6 | 32 | 72 | 110 |
| 2001 | 2 | 17 | 55 | 74 |
| Total | 58 | 256 | 455 | 769 |

Percentages:

| <0.5 | 0.5-1.0 | >1 | Total |
|---|---|---|---|
| Low | Medium | High | |
| 3 | 19 | 78 | 100 |
| 5 | 40 | 55 | 100 |
| 0 | 17 | 83 | 100 |
| 5 | 32 | 63 | 100 |
| 15 | 42 | 42 | 100 |
| 5 | 29 | 65 | 100 |
| 3 | 23 | 74 | 100 |
| 8 | 33 | 59 | 100 |

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Lowest: | 0.3 | 0.3 | 0.5 | 0.1 | 0.1 | 0.2 | 0.1 | |
| Highest: | 29.7 | 43.3 | 9.1 | 6.8 | 4.6 | 10.7 | 15.7 | |
| Mean: | 3.7 | 2.0 | 2.1 | 1.7 | 1.1 | 1.8 | 2.2 | |
| Median: | 1.9 | 1.1 | 1.7 | 1.5 | 0.9 | 1.4 | 1.6 | |

# 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 |