

# Soil Sample Survey

# Nassau Co.

**Samples analyzed by CNAL in 1995-2001**

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**Summary compiled by**

**Quirine M. Ketterings, Hettie Krol, and W. Shaw Reid**

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

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## 1. General Survey Summary

This survey summarizes the soil test results from Nassau County soil samples submitted for analyses to the Cornell Nutrient Analysis Laboratory (CNAL) during 1995-2001. The total number of samples analyzed in this period amounted to 577 (see Figure 1).

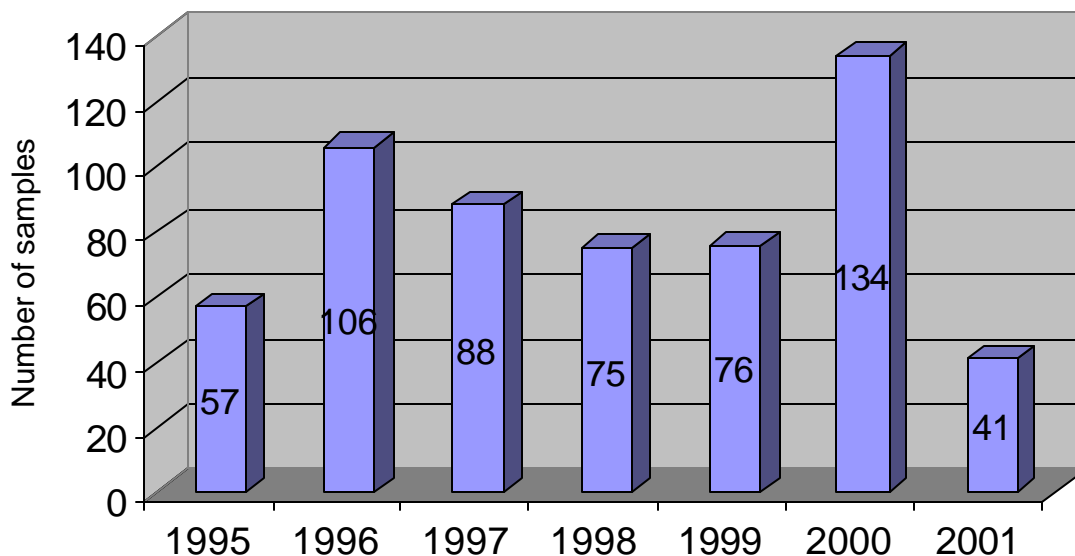


Figure 1: Distribution of home and garden samples submitted to the Cornell Nutrient Analysis Laboratory from 1995-2001.

Twenty-seven percent of the samples were submitted to obtain soil fertility data and recommendations for lawns. Another 20% of the samples came from vegetable gardens while others requested recommendations for azaleas, athletic fields, cemeteries, flowering annuals, greens, perennials, parks, roses, sod production and ornamentals.

The soil types of the home and garden samples that were submitted by people living in Nassau County were classified as silty soils (10%), silt loams (24%), sandy loams (39%) or sands (27%). The silty soils belong to soil management 2. The silt loams are from soil management group 3 while the sandy loams and sands belong to soil management groups 4 and 5, respectively. Table 1 on page 5 gives descriptions of each of the soil management groups.

Table 1: Characteristics of 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.   |

Organic matter levels of the samples varied from less than 1% to slightly over 25% for a few samples (most likely organic amendments rather than regular soil sample). Twenty-nine percent of the samples had between 3 and 4% organic matter while 23% had organic matter levels between 2 and 3% and 18% tested between 4 and 5% organic matter. Organic matter levels greater than 5% were found in 22% of the samples while 8% contained less than 2% organic matter. Eighty-one percent of the samples had between 2 and 6% organic matter.

Soil pH is a measure of soil acidity. Some plants are adapted to lower pH while others grow best on higher pH soils (generally pH 6 and over). Table 2 on page 6 shows examples of ornamentals adapted to low versus higher pH status. The pH values of the soils submitted to the Cornell Nutrient Analysis Laboratory varied from pH 4.3 to pH 8.6. Four percent of the samples had a pH less than 5.0. Twenty-four percent tested between pH 5 and pH 6 while pH values over 6 but less than 8 were found for 71% of the samples. Really high pH values of 8 and higher (calcareous soils) were found for 7 of the samples.

Table 2: Ornamentals adapted pH less than or greater than 6.0

|                       |   |
|-----------------------|---|
| Adapted to pH 4.5-6.0 | Azalea, Bayberry, Chokeberry, Franklina, Holly, Inkberry, Leucothoe, Laurel, Oak, Pachistima, Pieris, Rhododendoron, Sheel Laurel, Snowball Hydrangea, Sourwood, Spicebush, Winter Holly  |
| Adapted to pH 6.0-7.5 | Abelia, Almond, Ajuga, Arborvitae, Ash, Barberry, Beautybush, Birch (White), Bittersweet, Boxwood, Chastetree, Chestnut, Clematis, Coralberry, Cotoneaster, Crabapple, Cranberry bush, Cypress, Daphne, Deutzia, Dogwood, Enkianthus, Euonymus, Firethorn, Fir, Forsythia, Fringe Tree, Germander, Ginko, Golden Chain, Hawthorn, Hemlock, Hollygrape, Honey Locust, Honeysuckle, Hornbeam, Hypericum, Ivy, Jetbead, Juniper, Larch, Lilac, Linden, Magnolia, Maple, Mockorange, Oak (English, Scarlet, Turkey), Pea Shrub, Pine, Plum (Flowering), Privet, Quince, Redbud, Rose of Sharon, Sassafras, Spirea, Spruce, Sweet Gum, Sweet Shrub, Sycamore, Tulip Tree, Tupello (Gum), Va. Creeper, Viburnum, Vinca, Walnut, Wayfaring Tree, Weigela, Willow, Wisteria, Witch Hazel, Yellow-wood, Yew. |

Extractable nutrients such as phosphorus (P), potassium (K), magnesium (Mg), iron (Fe), manganese (Mn), and zinc (Zn) were measured using the Morgan chemical extraction solution and method. This solution contains sodium acetate buffered at a pH of 4.8. Other extraction methods exist that give very different results.

Soil test phosphorus 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 40 lbs P/acre or more are classified as very high.

Of the home and garden samples that were submitted to the Cornell Nutrient Analysis Laboratory between 1995 and 2001, none tested very low in phosphorus. Three percent of the samples tested low in phosphorus while 7% were classified medium and almost 44% tested high in P. Just shy of 46% of the samples tested very high in phosphorus. This means that for 89% of the soils that were tested, for most plants, no additional phosphorus fertilizer would be needed.

Classifications for potassium depend on soil management group. The fine-textured soils of soil management group 1 contain a lot of potassium containing clay and have as a result a greater K supplying capacity than the coarse textured sandy soils (soil management group 5). Because of these differences in potassium supplying capacity

among soils of different origins (soil management groups as outlined in Table 1), the classification and interpretations for potassium availability differ among the six groups. This is shown in Table 3. So for example for soils in soil management group 5 (and 6), <60 lbs K/acre in the soil test means the soil is very low in K. If the soil test is between 60 and 114 lbs K/acre the soil is classified as low in potassium. Between 115 and 164 lbs K/acre is considered medium, between 165 and 269 lbs K/acre is high and >269 lbs K/acre is classified as very high in plant available potassium. For soils that are high or very high in potassium, the addition of potassium fertilizer is generally not needed for optimum plant growth and health.

Table 3: 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 submitted during 1995-2001, 5% were classified as very low in potassium. Twelve percent had low potassium availability while 23% were classified as medium in potassium. High potassium availability was identified in 28% of the samples whereas 32% of the samples were classified as very high in potassium.

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. Most soils submitted by Nassau residents tested high (17%) or very high (78%) for

magnesium while only 14 samples tested very low or low and 17 were medium in magnesium availability.

Soils with more than 50 lbs Morgan extractable iron per acre test excessive for iron availability. Anything lower than 50 lbs Fe/acre is considered normal. Of the 577 samples that were submitted, 559 (97%) were classified as normal in iron availability. The remainder of the samples had more iron than needed for optimum plant growth and those samples were hence classified as excessive in iron.

Soils with more than 100 lbs Morgan extractable manganese per acre are classified as excessive in Mn. Anything less than 100 lbs Mn per acre is classified as normal. Of the 577 samples that were submitted, 575 were classified as normal in manganese availability. Two samples had more manganese than needed for optimum plant growth and were hence classified as excessive in manganese.

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 of Nassau County, 98% tested high for zinc while 2% tested medium in zinc. There were no samples that were classified as low 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.



## 2. Cropping Systems

Crops for which recommendations are requested by homeowners:

|       | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Total | %   |
|-------|------|------|------|------|------|------|------|-------|-----|
| ALG   | 8    | 2    | 7    | 13   | 5    | 19   | 3    | 57    | 10  |
| ATF   | 0    | 30   | 4    | 0    | 0    | 16   | 0    | 50    | 9   |
| BLU   | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1     | 0   |
| CEM   | 0    | 0    | 1    | 0    | 0    | 31   | 0    | 32    | 6   |
| FAR   | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 1     | 0   |
| FLA   | 1    | 0    | 1    | 1    | 0    | 2    | 1    | 6     | 1   |
| GEN   | 0    | 0    | 2    | 0    | 2    | 0    | 0    | 4     | 1   |
| GRA   | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 1     | 0   |
| HRB   | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 1     | 0   |
| IDL   | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 3     | 1   |
| LAW   | 15   | 31   | 26   | 20   | 16   | 36   | 13   | 157   | 27  |
| MVG   | 19   | 27   | 16   | 18   | 19   | 14   | 5    | 118   | 20  |
| OTH   | 0    | 1    | 3    | 1    | 0    | 6    | 2    | 13    | 2   |
| PER   | 3    | 5    | 5    | 4    | 7    | 5    | 2    | 31    | 5   |
| PRK   | 0    | 0    | 0    | 1    | 6    | 0    | 0    | 7     | 1   |
| ROS   | 4    | 1    | 2    | 4    | 0    | 0    | 1    | 12    | 2   |
| RSP   | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 1     | 0   |
| SAG   | 6    | 7    | 19   | 11   | 16   | 2    | 11   | 72    | 12  |
| SOD   | 0    | 0    | 0    | 1    | 3    | 0    | 0    | 4     | 1   |
| SPB   | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1     | 0   |
| SUB   | 0    | 0    | 0    | 0    | 1    | 1    | 0    | 2     | 0   |
| TOM   | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1     | 0   |
| TRF   | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 2     | 0   |
|       |      |      |      |      |      |      |      |       |     |
| Total | 57   | 106  | 88   | 75   | 76   | 134  | 41   | 577   | 100 |

Notes:

See Appendix for Cornell crop codes.

### 3. Soil Types

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)      | 4    | 8    | 5    | 16   | 6    | 20   | 0    | 59    |
| SMG 3 (silt loam)  | 13   | 21   | 37   | 17   | 19   | 18   | 13   | 138   |
| SMG 4 (sandy loam) | 28   | 65   | 28   | 22   | 24   | 46   | 13   | 226   |
| SMG 5 (sandy)      | 12   | 12   | 18   | 20   | 27   | 50   | 15   | 154   |
| SMG 6 (mucky)      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     |
| Total              | 57   | 106  | 80   | 75   | 76   | 134  | 41   | 577   |

## 4. Organic Matter

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

|       | <1% | 1.0-<br>1.9 | 2.0-<br>2.9 | 3.0-<br>3.9 | 4.0-<br>4.9 | 5.0-<br>5.9 | 6.0-<br>6.9 | >6.9 | Total |
|-------|-----|-------------|-------------|-------------|-------------|-------------|-------------|------|-------|
| 1995  | 0   | 5           | 10          | 15          | 12          | 10          | 0           | 5    | 57    |
| 1996  | 1   | 4           | 22          | 28          | 21          | 21          | 2           | 7    | 106   |
| 1997  | 1   | 12          | 17          | 23          | 11          | 5           | 7           | 12   | 88    |
| 1998  | 2   | 0           | 15          | 24          | 18          | 5           | 4           | 7    | 75    |
| 1999  | 3   | 4           | 22          | 23          | 12          | 5           | 1           | 6    | 76    |
| 2000  | 3   | 5           | 36          | 40          | 27          | 10          | 6           | 7    | 134   |
| 2001  | 1   | 2           | 13          | 14          | 4           | 4           | 0           | 3    | 41    |
| Total | 11  | 32          | 135         | 167         | 105         | 60          | 20          | 47   | 577   |

|          | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |  |
|----------|------|------|------|------|------|------|------|--|
| Lowest:  | 1.2  | 0.6  | 0.9  | 0.6  | 0.1  | 0.1  | 0.2  |  |
| Highest: | 25.8 | 11.5 | 25.7 | 16.0 | 16.9 | 22.4 | 20.7 |  |
| Mean:    | 4.0  | 4.2  | 4.6  | 4.3  | 3.9  | 3.9  | 3.9  |  |
| Median:  | 3.9  | 3.9  | 3.6  | 3.7  | 3.3  | 3.5  | 3.2  |  |

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

|       | <1% | 1.0-<br>1.9 | 2.0-<br>2.9 | 3.0-<br>3.9 | 4.0-<br>4.9 | 5.0-<br>5.9 | 6.0-<br>6.9 | >6.9 | Total |
|-------|-----|-------------|-------------|-------------|-------------|-------------|-------------|------|-------|
| 1995  | 0   | 9           | 18          | 26          | 21          | 18          | 0           | 9    | 100   |
| 1996  | 1   | 4           | 21          | 26          | 20          | 20          | 2           | 7    | 100   |
| 1997  | 1   | 14          | 19          | 26          | 13          | 6           | 8           | 14   | 100   |
| 1998  | 3   | 0           | 20          | 32          | 24          | 7           | 5           | 9    | 100   |
| 1999  | 4   | 5           | 29          | 30          | 16          | 7           | 1           | 8    | 100   |
| 2000  | 2   | 4           | 27          | 30          | 20          | 7           | 4           | 5    | 100   |
| 2001  | 2   | 5           | 32          | 34          | 10          | 10          | 0           | 7    | 100   |
| Total | 2   | 6           | 23          | 29          | 18          | 10          | 3           | 8    | 100   |

## 5. pH

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  | 2    | 2       | 3       | 11      | 14      | 13      | 7       | 4       | 1       | 0    | 57    |
| 1996  | 1    | 4       | 7       | 9       | 17      | 21      | 25      | 22      | 0       | 0    | 106   |
| 1997  | 0    | 2       | 11      | 20      | 20      | 25      | 10      | 0       | 0       | 0    | 88    |
| 1998  | 0    | 1       | 11      | 15      | 20      | 17      | 10      | 1       | 0       | 0    | 75    |
| 1999  | 0    | 5       | 8       | 16      | 11      | 17      | 18      | 0       | 1       | 0    | 76    |
| 2000  | 1    | 1       | 6       | 12      | 34      | 39      | 32      | 5       | 2       | 2    | 134   |
| 2001  | 0    | 4       | 3       | 7       | 16      | 7       | 2       | 1       | 1       | 0    | 41    |
| Total | 4    | 19      | 49      | 90      | 132     | 139     | 104     | 33      | 5       | 2    | 577   |

|          | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |  |
|----------|------|------|------|------|------|------|------|--|
| Lowest:  | 4.4  | 4.4  | 4.7  | 4.6  | 4.6  | 4.3  | 4.5  |  |
| Highest: | 8.0  | 7.9  | 7.4  | 7.6  | 8.1  | 8.6  | 8.2  |  |
| Mean:    | -    | -    | -    | -    | -    | -    | -    |  |
| Median:  | 6.3  | 6.8  | 6.2  | 6.2  | 6.4  | 6.6  | 6.2  |  |

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  | 4    | 4       | 5       | 19      | 25      | 23      | 12      | 7       | 2       | 0    | 100   |
| 1996  | 1    | 4       | 7       | 8       | 16      | 20      | 24      | 21      | 0       | 0    | 100   |
| 1997  | 0    | 2       | 13      | 23      | 23      | 28      | 11      | 0       | 0       | 0    | 100   |
| 1998  | 0    | 1       | 15      | 20      | 27      | 23      | 13      | 1       | 0       | 0    | 100   |
| 1999  | 0    | 7       | 11      | 21      | 14      | 22      | 24      | 0       | 1       | 0    | 100   |
| 2000  | 1    | 1       | 4       | 9       | 25      | 29      | 24      | 4       | 1       | 1    | 100   |
| 2001  | 0    | 10      | 7       | 17      | 39      | 17      | 5       | 2       | 2       | 0    | 100   |
| Total | 1    | 3       | 8       | 16      | 23      | 24      | 18      | 6       | 1       | 0    | 100   |

## 6. Phosphorus

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   | 4   | 18   | 12    | 4     | 1      | 8       | 2       | 7    | 57    |
| 1996  | 0  | 1   | 1   | 54   | 21    | 6     | 4      | 2       | 8       | 9    | 106   |
| 1997  | 0  | 3   | 4   | 33   | 21    | 8     | 7      | 7       | 2       | 3    | 88    |
| 1998  | 0  | 0   | 4   | 35   | 11    | 3     | 2      | 5       | 4       | 11   | 75    |
| 1999  | 0  | 6   | 6   | 36   | 13    | 5     | 2      | 3       | 3       | 2    | 76    |
| 2000  | 0  | 5   | 17  | 60   | 23    | 17    | 2      | 1       | 4       | 5    | 134   |
| 2001  | 0  | 3   | 7   | 16   | 4     | 5     | 1      | 4       | 1       | 0    | 41    |
| Total | 0  | 19  | 43  | 252  | 105   | 48    | 19     | 30      | 24      | 37   | 577   |

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

|          | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |  |
|----------|------|------|------|------|------|------|------|--|
| Lowest:  | 1    | 2    | 1    | 4    | 1    | 1    | 2    |  |
| Highest: | 414  | 474  | 330  | 502  | 656  | 527  | 168  |  |
| Mean:    | 82   | 74   | 57   | 95   | 48   | 47   | 40   |  |
| Median:  | 45   | 37   | 45   | 37   | 25   | 21   | 25   |  |

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

|       | <1 | 1-3 | 4-8 | 9-39 | 40-60 | 61-80 | 81-100 | 101-150 | 151-200 | >200 | Total |
|-------|----|-----|-----|------|-------|-------|--------|---------|---------|------|-------|
|       | VL | L   | M   | H    | VH    | VH    | VH     | VH      | VH      | VH   |       |
| 1995  | 0  | 2   | 7   | 32   | 21    | 7     | 2      | 14      | 4       | 12   | 100   |
| 1996  | 0  | 1   | 1   | 51   | 20    | 6     | 4      | 2       | 8       | 8    | 100   |
| 1997  | 0  | 3   | 5   | 38   | 24    | 9     | 8      | 8       | 2       | 3    | 100   |
| 1998  | 0  | 0   | 5   | 47   | 15    | 4     | 3      | 7       | 5       | 15   | 100   |
| 1999  | 0  | 8   | 8   | 47   | 17    | 7     | 3      | 4       | 4       | 3    | 100   |
| 2000  | 0  | 4   | 13  | 45   | 17    | 13    | 1      | 1       | 3       | 4    | 100   |
| 2001  | 0  | 7   | 17  | 39   | 10    | 12    | 2      | 10      | 2       | 0    | 100   |
| Total | 0  | 3   | 7   | 44   | 18    | 8     | 3      | 5       | 4       | 6    | 100   |

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

## 7. Potassium

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      | 2       | 2         | 4     |
| 1996                    | 0        | 0     | 0      | 1       | 7         | 8     |
| 1997                    | 0        | 0     | 0      | 1       | 4         | 5     |
| 1998                    | 0        | 0     | 0      | 7       | 9         | 16    |
| 1999                    | 0        | 1     | 0      | 3       | 2         | 6     |
| 2000                    | 0        | 0     | 1      | 7       | 12        | 20    |
| 2001                    | 0        | 0     | 0      | 0       | 0         | 0     |
| Total (#)               | 0        | 1     | 1      | 21      | 36        | 59    |
| Total (%)               | 0        | 2     | 2      | 36      | 61        | 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      | 6       | 5         | 13    |
| 1996                    | 0        | 5     | 3      | 7       | 6         | 21    |
| 1997                    | 2        | 5     | 11     | 3       | 16        | 37    |
| 1998                    | 1        | 0     | 3      | 5       | 8         | 17    |
| 1999                    | 0        | 2     | 3      | 5       | 9         | 19    |
| 2000                    | 0        | 0     | 5      | 8       | 5         | 18    |
| 2001                    | 0        | 1     | 7      | 1       | 4         | 13    |
| Total (#)               | 3        | 13    | 34     | 35      | 53        | 138   |
| Total (%)               | 2        | 9     | 25     | 25      | 38        | 100   |

| Soil Management Group 4 |          |        |         |         |           |       |
|-------------------------|----------|--------|---------|---------|-----------|-------|
|                         | <55      | 55-99  | 100-149 | 150-239 | >239      | Total |
|                         | Very Low | Low    | Medium  | High    | Very High |       |
| 1995                    | 1        | 6      | 3       | 7       | 11        | 28    |
| 1996                    | 1        | 6      | 15      | 17      | 26        | 65    |
| 1997                    | 3        | 5      | 6       | 8       | 6         | 28    |
| 1998                    | 1        | 0      | 5       | 4       | 12        | 22    |
| 1999                    | 0        | 3      | 3       | 10      | 8         | 24    |
| 2000                    | 0        | 5      | 16      | 15      | 10        | 46    |
| 2001                    | 0        | 5      | 3       | 3       | 2         | 13    |
| Total (#)               | 6        | 30     | 51      | 64      | 75        | 226   |
| Total (%)               | 3        | 13     | 23      | 28      | 33        | 100   |
| Soil Management Group 5 |          |        |         |         |           |       |
|                         | <60      | 60-114 | 115-164 | 165-269 | >269      | Total |
|                         | Very Low | Low    | Medium  | High    | Very High |       |
| 1995                    | 0        | 3      | 3       | 4       | 2         | 12    |
| 1996                    | 2        | 0      | 5       | 4       | 1         | 12    |
| 1997                    | 2        | 8      | 3       | 2       | 3         | 18    |
| 1998                    | 1        | 5      | 4       | 8       | 2         | 20    |
| 1999                    | 10       | 3      | 3       | 7       | 4         | 27    |
| 2000                    | 4        | 6      | 15      | 19      | 6         | 50    |
| 2001                    | 3        | 1      | 11      | 0       | 0         | 15    |
| Total (#)               | 22       | 26     | 44      | 44      | 18        | 154   |
| Total (%)               | 14       | 17     | 29      | 29      | 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        | 9   | 8      | 19   | 20        | 57    |
| 1996        | 3        | 11  | 23     | 29   | 40        | 106   |
| 1997        | 7        | 18  | 20     | 14   | 29        | 88    |
| 1998        | 3        | 5   | 12     | 24   | 31        | 75    |
| 1999        | 10       | 9   | 9      | 25   | 23        | 76    |
| 2000        | 4        | 11  | 37     | 49   | 33        | 134   |
| 2001        | 3        | 7   | 21     | 4    | 6         | 41    |
| Total #     | 31       | 70  | 130    | 164  | 182       | 577   |

|          | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |  |
|----------|------|------|------|------|------|------|------|--|
| Lowest:  | 54   | 35   | 38   | 35   | 27   | 27   | 17   |  |
| Highest: | 1359 | 709  | 1957 | 2296 | 1290 | 2274 | 1380 |  |
| Mean:    | 224  | 222  | 221  | 247  | 221  | 214  | 171  |  |
| Median:  | 176  | 189  | 133  | 182  | 177  | 161  | 122  |  |

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

| Summary (%) | Very Low | Low | Medium | High | Very High | Total |
|-------------|----------|-----|--------|------|-----------|-------|
| 1995        | 2        | 16  | 14     | 33   | 35        | 100   |
| 1996        | 3        | 10  | 22     | 27   | 38        | 100   |
| 1997        | 8        | 20  | 23     | 16   | 33        | 100   |
| 1998        | 4        | 7   | 16     | 32   | 41        | 100   |
| 1999        | 13       | 12  | 12     | 33   | 30        | 100   |
| 2000        | 3        | 8   | 28     | 37   | 25        | 100   |
| 2001        | 7        | 17  | 51     | 10   | 15        | 100   |
| Grand Total | 5        | 12  | 23     | 28   | 32        | 100   |



## 8. Magnesium

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     | 4      | 12      | 41        | 57    |
| 1996  | 0        | 3     | 2      | 12      | 89        | 106   |
| 1997  | 0        | 2     | 3      | 15      | 68        | 88    |
| 1998  | 0        | 1     | 2      | 9       | 63        | 75    |
| 1999  | 0        | 3     | 3      | 17      | 53        | 76    |
| 2000  | 0        | 2     | 2      | 23      | 107       | 134   |
| 2001  | 1        | 2     | 1      | 8       | 29        | 41    |
| Total | 1        | 13    | 17     | 96      | 450       | 577   |

|          | 1995 | 1996 | 1997 | 1998 | 1999 | 2000  | 2001 |  |
|----------|------|------|------|------|------|-------|------|--|
| Lowest:  | 85   | 29   | 54   | 32   | 47   | 50    | 13   |  |
| Highest: | 1814 | 1019 | 1594 | 2474 | 1587 | 12657 | 1191 |  |
| Mean:    | 350  | 373  | 389  | 397  | 315  | 438   | 313  |  |
| Median:  | 336  | 335  | 286  | 330  | 244  | 285   | 250  |  |

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

|       | <20      | 20-65 | 66-100 | 101-199 | >199      | Total |
|-------|----------|-------|--------|---------|-----------|-------|
|       | Very Low | Low   | Medium | High    | Very High |       |
| 1995  | 0        | 0     | 7      | 21      | 72        | 100   |
| 1996  | 0        | 3     | 2      | 11      | 84        | 100   |
| 1997  | 0        | 2     | 3      | 17      | 77        | 100   |
| 1998  | 0        | 1     | 3      | 12      | 84        | 100   |
| 1999  | 0        | 4     | 4      | 22      | 70        | 100   |
| 2000  | 0        | 1     | 1      | 17      | 80        | 100   |
| 2001  | 2        | 5     | 2      | 20      | 71        | 100   |
| Total | 0        | 2     | 3      | 17      | 78        | 100   |

## 9. Iron

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

Total number of samples:

|       | 0-49   | >49       | Total |
|-------|--------|-----------|-------|
|       | Normal | Excessive |       |
| 1995  | 54     | 3         | 57    |
| 1996  | 105    | 1         | 106   |
| 1997  | 86     | 2         | 88    |
| 1998  | 74     | 1         | 75    |
| 1999  | 68     | 8         | 76    |
| 2000  | 131    | 3         | 134   |
| 2001  | 41     | 0         | 41    |
| Total | 559    | 18        | 577   |

Percentages:

|  | 0-49   | >49       | Total |
|--|--------|-----------|-------|
|  | Normal | Excessive |       |
|  | 95     | 5         | 100   |
|  | 99     | 1         | 100   |
|  | 98     | 2         | 100   |
|  | 99     | 1         | 100   |
|  | 89     | 11        | 100   |
|  | 98     | 2         | 100   |
|  | 100    | 0         | 100   |
|  | 97     | 3         | 100   |

|          | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |  |
|----------|------|------|------|------|------|------|------|--|
| Lowest:  | 2    | 2    | 1    | 1    | 1    | 1    | 2    |  |
| Highest: | 193  | 94   | 101  | 50   | 67   | 328  | 34   |  |
| Mean:    | 16   | 11   | 11   | 10   | 17   | 12   | 9    |  |
| Median:  | 8    | 7    | 7    | 6    | 10   | 7    | 6    |  |

## 10. Manganese

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

Total number of samples:

|       | 0-99   | >99       | Total |
|-------|--------|-----------|-------|
|       | Normal | Excessive |       |
| 1995  | 57     | 0         | 57    |
| 1996  | 105    | 1         | 106   |
| 1997  | 88     | 0         | 88    |
| 1998  | 75     | 0         | 75    |
| 1999  | 75     | 1         | 76    |
| 2000  | 134    | 0         | 134   |
| 2001  | 41     | 0         | 41    |
| Total | 575    | 2         | 577   |

Percentages:

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

|          | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |  |
|----------|------|------|------|------|------|------|------|--|
| Lowest:  | 3    | 4    | 1    | 5    | 4    | 2    | 1    |  |
| Highest: | 31   | 140  | 83   | 79   | 337  | 64   | 51   |  |
| Mean:    | 15   | 20   | 18   | 20   | 24   | 13   | 14   |  |
| Median:  | 16   | 18   | 14   | 17   | 16   | 9    | 11   |  |

## 11. Zinc

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       | 56   | 57    |
| 1996  | 0    | 1       | 105  | 106   |
| 1997  | 0    | 0       | 88   | 88    |
| 1998  | 0    | 0       | 75   | 75    |
| 1999  | 0    | 0       | 76   | 76    |
| 2000  | 0    | 11      | 123  | 134   |
| 2001  | 0    | 0       | 41   | 41    |
| Total | 0    | 13      | 564  | 577   |

Percentages:

| <0.5 | 0.5-1.0 | >1   | Total |
|------|---------|------|-------|
| Low  | Medium  | High |       |
| 0    | 2       | 98   | 100   |
| 0    | 1       | 99   | 100   |
| 0    | 0       | 100  | 100   |
| 0    | 0       | 100  | 100   |
| 0    | 0       | 100  | 100   |
| 0    | 8       | 92   | 100   |
| 0    | 0       | 100  | 100   |
| 0    | 2       | 98   | 100   |

|          | 1995  | 1996 | 1997  | 1998 | 1999  | 2000  | 2001  |  |
|----------|-------|------|-------|------|-------|-------|-------|--|
| Lowest:  | 0.1   | 0.9  | 1.1   | 1.2  | 1.9   | 0.5   | 1.1   |  |
| Highest: | 177.2 | 86.7 | 251.7 | 63.4 | 137.4 | 105.5 | 339.8 |  |
| Mean:    | 22.0  | 12.6 | 19.3  | 13.6 | 17.8  | 13.5  | 27.4  |  |
| Median:  | 10.3  | 11.2 | 13.6  | 8.5  | 8.8   | 7.6   | 12.2  |  |

## Appendix: Cornell Crop Codes

Crop codes are used in the Cornell Nutrient Analyses Laboratory.

| Crop Code | Crop Description                     |
|-----------|--------------------------------------|
| ALG       | Azalea                               |
| ATF       | Athletic Field                       |
| BLU/BLB   | Blueberries                          |
| CEM       | Cemetery                             |
| FAR       | Fairway                              |
| FLA       | Flowering Annuals                    |
| GEN       | Green                                |
| GRA       | Grapes                               |
| HRB       | Herbs                                |
| IDL       | Idle land                            |
| LAW       | Lawn                                 |
| MVG       | Mixed vegetables                     |
| OTH       | Other                                |
| PER       | Perennials                           |
| PRK       | Park                                 |
| ROS       | Roses                                |
| RSP       | Raspberries                          |
| SAG       | Ornamentals adapted to pH 6.0 to 7.5 |
| SOD       | Sod production                       |
| SPB       | Spring flowering bulbs               |
| SUB       | Summer flowering bulbs               |
| TOM       | Tomatoes                             |
| TRF       | Tree fruits                          |