

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

Home and Garden Soil Sample Survey

Westchester Co.

Samples analyzed by CNAL in 1995-2001



Photo by George Morrison.

Summary compiled by

Quirine M. Ketterings, Hettie Krol, W. Shaw Reid
James G. Lee and Gerald G. Giordano



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

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

Soil Sample Survey

Westchester Co.

Samples analyzed by CNAL in 1995-2001

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

James G. Lee and Gerald G. Giordano

Cornell Cooperative Extension of Westchester County

July 1, 2004

Correct Citation:

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee and G.G. Giordano (2004). Home and garden soil samples survey of Westchester County. Samples analyzed by the Cornell Nutrient Analysis Laboratory in 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

Table of Contents

1. General Survey Summary.....	4
2. Cropping Systems	11
3. Soil Types	12
4. Organic Matter	13
5. pH	14
6. Phosphorus.....	15
7. Potassium.....	16
8. Magnesium	19
9. Iron.....	20
10. Manganese	21
11. Zinc	22
Appendix: Cornell Crop Codes	23

1. County Introduction

Westchester County is a community of over 900,000 residents. It's hilly terrain is bordered by New York City on the South, Connecticut to the East, the Hudson River on the West, and Putnam County to the North. The southern part of the county is a mix of urban as well as wooded suburban neighborhoods and consists of the major cities of Yonkers, Mount Vernon, New Rochelle, and White Plains. The northern part of the county still retains a rural character and farms are an important part of the landscape. The two largest sectors of agriculture in the county are the nursery and greenhouse business, and horse farms. Other agricultural sectors include hay, fruit, and vegetable production.

Water resources are important in Westchester County. These include the Croton, Kensico, and portions of the Long Island Sound watersheds. Along with the Catskill watershed, Westchester County supplies drinking water for millions of people within the county and in New York City. Efforts to protect farmland and water quality are priority issues for county government.

Consumer horticulture is a highly developed and sophisticated industry in Westchester County. High property values support an economically important landscape maintenance industry. Typical of the northeast, Westchester County is home to many beautiful, mature tree specimens. Most home horticulture and gardening involve lawns and ornamental horticulture. However, a large number of people also grow vegetables, particularly tomatoes, and a variety of fruits.

An important factor to keep in mind when reading this summary is that, unlike farmers who may sample their soil on a routine basis, many non-farmers generally do not have their soil tested unless a problem exists with what they are trying to grow. These summary results may be skewed toward problem soils. Even so, this soil test summary provides interesting and useful information. For example, most soils tested in Westchester County from 1995 – 2001 were not nutrient deficient and the majority of soils had a soil pH over 6 but less than 8. The latter pH ranges may be due to historical observations by the local Extension office that periodic limestone applications to local landscapes may be a part of regular gardening practices on cultivated properties.

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
CSS Extension Bulletin E04-27. 23 pages.

Excepting ericaceous plants, this soil pH range is satisfactory for most ornamentals, fruits, and vegetables. In general, lawns in our area should be kept in the soil pH range of 6 – 7 with an optimum pH of 6.8. The majority of tested soils also appear to have adequate amounts of phosphorus to grow different plants including lawns. This is important information because excess phosphorus continues to be a problem in certain bodies of water in Westchester County. One of the manageable sources of this phosphorus is phosphorus-containing fertilizer for lawns. While newly seeded lawns can benefit from a starter fertilizer containing phosphorus, fertilizers containing phosphorus should not be applied to established lawns unless a soil test report specifically indicates that it is needed.

2. General Survey Summary

This survey summarizes the soil test results from home and garden soil samples from Westchester County submitted for analyses to the Cornell Nutrient Analysis Laboratory (CNAL) during 1995-2001. The total number of samples analyzed in these years amounted to 1039 (see Figure 1).

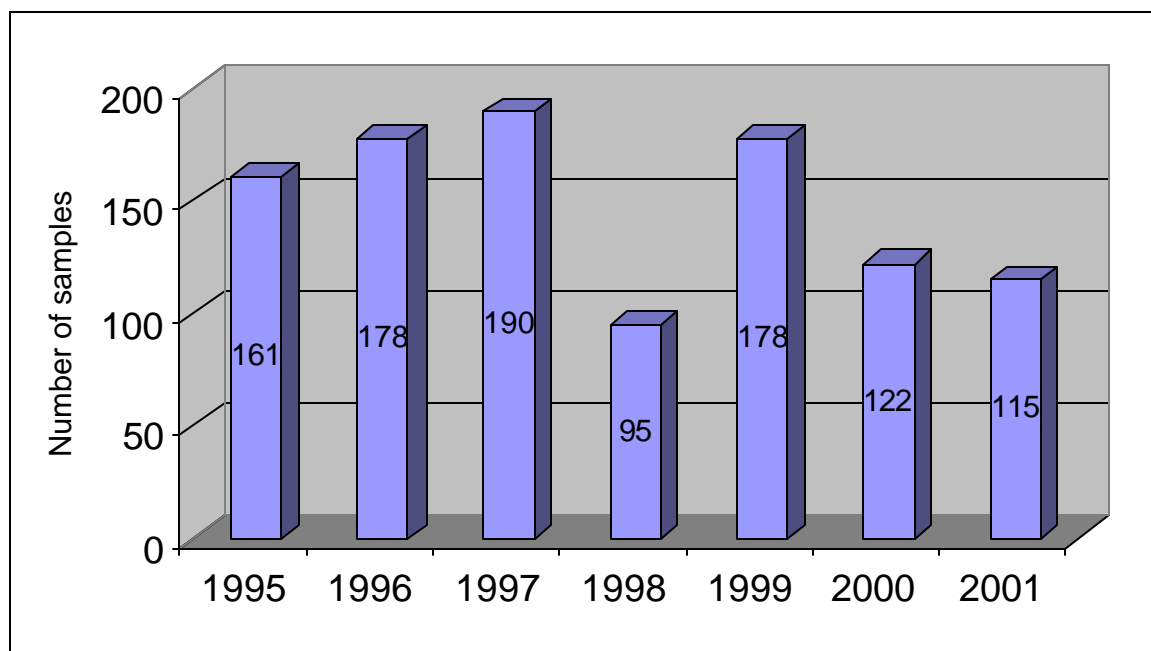


Figure 1: Distribution of Westchester County home and garden samples submitted to the Cornell Nutrient Analysis Laboratory from 1995-2001.

Twenty-nine percent of the samples were submitted to obtain soil fertility data and recommendations for lawns. Another 17% of the samples were analyzed for ornamentals and 12% came from vegetable gardens while others requested recommendations for azaleas, athletic fields, cemeteries, fairways, flowering annuals, perennials, roadsides, roses, and tree fruits.

The soil types of the home and garden samples that were submitted by people living in Westchester County were classified as silty soils (16%), silt loams (36%), sandy loams (39%) or sands (9%). The silty soils belong to soil management 2. The silt loams are

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

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 almost 50% for one sample (most likely an organic amendment or muck soil rather than a regular mineral soil sample). Twenty-seven percent of the samples had between 3 and 4% organic matter while 17% 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 31% of the samples while 7% contained less than 2% organic matter. Seventy-three 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 Westchester soils submitted to the Cornell Nutrient Analysis Laboratory varied from pH

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

4.2 to pH 8.9. Five percent of the samples had a pH less than 5.0. Twenty-five percent tested between pH 5 and pH 6 while pH values over 6 but less than 8 were found for 69% of the samples. Really high pH values of 8 and higher (calcareous soils) were found for 1% 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, Rhododendron, 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 Westchester County home and garden samples that were submitted to the Cornell Nutrient Analysis Laboratory between 1995 and 2001, none tested very low in phosphorus. Nine percent of the samples tested low in phosphorus while 14% were classified medium and 43% tested high in P. Thirty-four percent of the samples tested very high in phosphorus. This meant that for 77% of the soils that were tested, for most plants, no additional phosphorus fertilizer would be needed.

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

Classifications for potassium depend on soil management groups. 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 groups.

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, 1% was classified as very low in potassium. Seven percent had low potassium availability while 14% were classified as medium in potassium. High potassium availability was identified in 29% of the samples whereas 47% 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

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

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 Westchester soils tested high (13%) or very high (82%) for magnesium while only 26 samples tested low and 29 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 1039 samples that were submitted, 967 (93%) were classified as normal in iron availability. The remainder of the samples had more iron than needed for optimum plant growth and 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 1039 samples that were submitted, 1024 (99%) were classified as normal in manganese availability. The remainder of the 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, 97% tested high for zinc while 2% tested medium in zinc and only 1 sample was 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.

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

3. Cropping Systems

Crops for which recommendations are requested by homeowners:

	1995	1996	1997	1998	1999	2000	2001	Total	%
ALG	13	23	13	8	25	14	9	105	10
APR	0	0	0	1	1	0	0	2	0
ATF	23	0	9	1	4	6	8	51	5
BLU	0	1	0	0	1	0	0	2	0
CEM	6	0	2	4	4	0	0	16	2
FAR	0	14	6	7	0	0	0	27	3
FLA	2	4	2	2	0	1	2	13	1
GEN	0	0	12	0	0	0	0	12	1
HRB	2	0	0	1	1	2	0	6	1
IDL	0	0	0	0	0	3	0	3	0
LAW	32	33	73	31	56	37	39	301	29
MVG	20	29	27	8	14	14	14	126	12
OTH	0	4	1	0	6	5	5	21	2
PER	23	12	20	13	18	11	15	112	11
PRK	0	0	0	2	2	0	0	4	0
ROD	1	0	7	0	0	0	0	8	1
ROS	3	10	6	2	1	5	2	29	3
RSP	0	1	1	1	0	0	0	3	0
SAG	33	47	10	10	40	15	17	172	17
STR	0	0	0	0	0	0	1	1	0
TOM	0	0	0	0	1	0	0	1	0
TRF	1	0	0	2	1	3	0	7	1
Unknown	2	0	1	2	3	6	3	17	2
Total	161	178	190	95	178	122	115	1039	100

Notes:

See Appendix for Cornell crop codes.

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

4. 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)	29	40	23	12	21	29	15	169
SMG 3 (silt loam)	61	77	77	24	50	41	44	374
SMG 4 (sandy loam)	66	48	67	43	83	50	47	404
SMG 5 (sandy)	5	13	23	16	24	2	9	92
SMG 6 (mucky)	0	0	0	0	0	0	0	0
Total	161	178	190	95	178	122	115	1039

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

5. Organic Matter

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	7	24	48	23	15	12	32	161
1996	1	7	35	50	39	24	13	9	178
1997	2	12	36	58	43	13	3	23	190
1998	3	6	10	21	17	13	11	14	95
1999	0	17	34	39	34	22	12	20	178
2000	2	7	20	31	18	13	10	21	122
2001	3	9	19	32	15	12	8	17	115
Total	11	65	178	279	189	112	69	136	1039

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	1.0	0.6	0.6	0.3	1.2	0.3	0.2	
Highest:	48.2	16.1	17.0	24.9	17.5	20.3	13.9	
Mean:	5.6	4.2	4.2	5.1	4.4	5.0	4.6	
Median:	4.0	3.9	3.7	4.5	3.9	4.1	3.8	

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

	<1%	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	>6.9	Total
1995	0	4	15	30	14	9	7	20	100
1996	1	4	20	28	22	13	7	5	100
1997	1	6	19	31	23	7	2	12	100
1998	3	6	11	22	18	14	12	15	100
1999	0	10	19	22	19	12	7	11	100
2000	2	6	16	25	15	11	8	17	100
2001	3	8	17	28	13	10	7	15	100
Total	1	6	17	27	18	11	7	13	100

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

6. 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	0	6	22	29	20	40	20	20	4	0	161
1996	2	10	18	25	33	56	28	5	1	0	178
1997	1	10	16	38	39	49	31	6	0	0	190
1998	6	4	17	12	16	27	9	3	1	0	95
1999	1	7	17	19	36	49	34	15	0	0	178
2000	2	1	8	14	16	36	29	13	2	1	122
2001	0	4	9	15	25	31	23	8	0	0	115
Total	12	42	107	152	185	288	174	70	8	1	1039

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	4.6	4.2	4.4	4.2	4.3	4.3	4.5	
Highest:	8.1	8.1	7.7	8.1	7.9	8.9	7.9	
Mean:	-	-	-	-	-	-	-	
Median:	6.5	6.5	6.4	6.2	6.6	6.7	6.5	

Percent of home and garden samples within each pH range:

	<4.5	4.5-4.9	5.0-5.4	5.5-5.9	6.0-6.4	6.5-6.9	7.0-7.4	7.5-7.9	8.0-8.4	>8.4	Total
1995	0	4	14	18	12	25	12	12	2	0	100
1996	1	6	10	14	19	31	16	3	1	0	100
1997	1	5	8	20	21	26	16	3	0	0	100
1998	6	4	18	13	17	28	9	3	1	0	100
1999	1	4	10	11	20	28	19	8	0	0	100
2000	2	1	7	11	13	30	24	11	2	1	100
2001	0	3	8	13	22	27	20	7	0	0	100
Total	1	4	10	15	18	28	17	7	1	0	100

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

7. 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	24	20	76	8	9	5	6	5	8	161
1996	0	9	20	92	18	14	9	7	3	6	178
1997	0	17	21	80	35	16	3	10	0	8	190
1998	0	17	13	35	13	0	5	5	2	5	85
1999	0	12	32	74	19	13	11	10	2	5	178
2000	0	8	20	43	14	4	3	13	4	13	122
2001	0	6	22	49	18	2	4	7	3	4	115
Total	0	93	148	449	125	58	40	58	19	49	1039

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	2	1	
Highest:	919	291	532	499	499	376	359	
Mean:	50	44	47	50	47	68	43	
Median:	15	28	25	22	23	28	18	

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	15	12	47	5	6	3	4	3	5	100
1996	0	5	11	52	10	8	5	4	2	3	100
1997	0	9	11	42	18	8	2	5	0	4	100
1998	0	18	14	37	14	0	5	5	2	5	100
1999	0	7	18	42	11	7	6	6	1	3	100
2000	0	7	16	35	11	3	2	11	3	11	100
2001	0	5	19	43	16	2	3	6	3	3	100
Total	0	9	14	43	12	6	4	6	2	5	100

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

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

8. 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	10	19	29
1996	0	0	1	16	23	40
1997	0	1	3	5	14	23
1998	0	0	1	3	8	12
1999	0	0	2	7	12	21
2000	1	0	0	8	20	29
2001	0	1	3	5	6	15
Total (#)	1	2	10	54	102	169
Total (%)	1	1	6	32	60	100
Soil Management Group 3						
	<45	45-79	80-119	120-199	>199	Total
	Very Low	Low	Medium	High	Very High	
1995	0	1	12	25	23	61
1996	0	2	4	21	50	77
1997	1	1	9	20	46	77
1998	0	0	3	5	16	24
1999	0	2	7	16	25	50
2000	3	2	4	14	18	41
2001	1	1	0	23	19	44
Total (#)	5	9	39	124	197	374
Total (%)	1	2	10	33	53	100

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

Soil Management Group 4						
	<55	55-99	100-149	150-239	>239	Total
	Very Low	Low	Medium	High	Very High	
1995	1	8	7	18	32	66
1996	0	6	12	17	13	48
1997	1	9	23	15	19	67
1998	0	1	6	12	24	43
1999	1	6	6	29	41	83
2000	0	4	7	14	25	50
2001	1	1	11	14	20	47
Total (#)	4	35	72	119	174	404
Total (%)	1	9	18	29	43	100
Soil Management Group 5						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
1995	1	1	1	0	2	5
1996	1	3	0	4	5	13
1997	1	7	4	6	5	23
1998	0	3	5	6	2	16
1999	0	8	6	7	3	24
2000	0	2	0	0	0	2
2001	1	1	4	2	1	9
Total (#)	4	25	20	25	18	92
Total (%)	4	27	22	27	20	100
Soil Management Group 6						
	<60	60-114	115-164	165-269	>269	Total
	Very Low	Low	Medium	High	Very High	
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
Total (#)	0	0	0	0	0	0
Total (%)	-	-	-	-	-	-

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

Number of home and garden samples within each potassium classification:

Summary (#)	Very Low	Low	Medium	High	Very High	Total
1995	2	10	20	53	76	161
1996	1	11	17	58	91	178
1997	3	18	39	46	84	190
1998	0	4	15	26	50	95
1999	1	16	21	59	81	178
2000	4	8	11	36	63	122
2001	3	4	18	44	46	115
Total #	14	71	141	322	491	1039

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	53	31	41	71	50	29	23	
Highest:	2848	1649	2174	912	1322	2780	1082	
Mean:	294	259	238	272	249	308	237	
Median:	201	203	189	224	211	216	188	

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

Summary (%)	Very Low	Low	Medium	High	Very High	Total
1995	1	6	12	33	47	100
1996	1	6	10	33	51	100
1997	2	9	21	24	44	100
1998	0	4	16	27	53	100
1999	1	9	12	33	46	100
2000	3	7	9	30	52	100
2001	3	3	16	38	40	100
Grand Total	1	7	14	31	47	100

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

9. 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	5	7	19	130	161
1996	0	1	4	30	143	178
1997	0	6	4	28	152	190
1998	0	6	6	15	68	95
1999	0	4	3	19	152	178
2000	0	1	2	11	108	122
2001	0	3	3	11	98	115
Total	0	26	29	133	851	1039

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	34	53	28	29	32	25	23	
Highest:	3013	2028	1891	2492	2186	2368	1399	
Mean:	467	390	401	399	451	578	420	
Median:	369	364	354	344	408	506	337	

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	3	4	12	81	100
1996	0	1	2	17	80	100
1997	0	3	2	15	80	100
1998	0	6	6	16	72	100
1999	0	2	2	11	85	100
2000	0	1	2	9	89	100
2001	0	3	3	10	85	100
Total	0	3	3	13	82	100

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

10. Iron

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

Total number of samples:

	0-49	>49	Total
	Normal	Excessive	
1995	137	24	161
1996	160	18	178
1997	185	5	190
1998	86	9	95
1999	171	7	178
2000	116	6	122
2001	112	3	115
Total	967	72	1039

Percentages:

	0-49	>49	Total
	Normal	Excessive	
	85	15	100
	90	10	100
	97	3	100
	91	9	100
	96	4	100
	95	5	100
	97	3	100
	93	7	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	2	1	2	1	1	1	1	
Highest:	171	337	82	158	148	244	116	
Mean:	22	23	14	21	14	14	12	
Median:	11	9	9	10	8	6	7	

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

11. Manganese

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

Total number of samples:

	0-99	>99	Total
	Normal	Excessive	
1995	161	0	161
1996	176	2	178
1997	185	5	190
1998	92	3	95
1999	175	3	178
2000	120	2	122
2001	115	0	115
Total	1024	15	1039

Percentages:

0-99	>99	Total
Normal	Excessive	
100	0	100
99	1	100
97	3	100
97	3	100
98	2	100
98	2	100
100	0	100
99	1	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	4	2	8	5	6	5	8	
Highest:	99	103	286	131	143	105	62	
Mean:	36	33	34	31	30	29	28	
Median:	30	29	28	24	23	24	27	

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001.
 CSS Extension Bulletin E04-27. 23 pages.

12. 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	3	158	161
1996	0	3	175	178
1997	0	3	187	190
1998	0	3	92	95
1999	1	5	172	178
2000	0	2	120	122
2001	0	6	109	115
Total	1	25	1013	1039

Percentages:

<0.5	0.5-1.0	>1	Total
Low	Medium	High	
0	2	98	100
0	2	98	100
0	2	98	100
0	3	97	100
1	3	97	100
0	2	98	100
0	5	95	100
0	2	97	100

	1995	1996	1997	1998	1999	2000	2001	
Lowest:	0.9	0.7	0.5	0.5	0.3	0.8	0.5	
Highest:	245.1	145.1	56.1	544.1	135.6	168.1	87.4	
Mean:	14.9	14.0	9.8	23.5	13.6	13.3	10.8	
Median:	7.2	7.0	6.9	7.1	7.9	6.4	7.2	

Ketterings, Q.M., H. Krol, W.S. Reid, J.G. Lee, and G.G. Giordano (2004). Home and garden soil sample survey of Westchester County 1995-2001. CSS Extension Bulletin E04-27. 23 pages.

Appendix: Cornell Crop Codes

Crop codes are used in the Cornell Nutrient Analyses Laboratory.

Crop Code	Crop Description
ALG	Azalea
APR	Asparagus
ATF	Athletic Field
BLU	Blueberries
CEM	Cemetery
FAR	Fairway
FLA	Flowering Annuals
GEN	Green
HRB	Herbs
IDL	Idle land
LAW	Lawn
MVG	Mixed vegetables
OTH	Other
PER	Perennials
PRK	Park
ROD	Roadside
ROS	Roses
RSP	Raspberries
SAG	Ornamentals adapted to pH 6.0 to 7.5
STR	Strawberries
TOM	Tomatoes
TRF	Tree Fruits