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Home and Garden Soil Sample Survey

Putnam 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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July 26, 2004

Correct Citation:

Ketterings, Q.M., H. Krol, W.S. Reid, and D. Olsen (2004). Soil samples survey of Putnam County. Samples analyzed by the Cornell Nutrient Analysis Laboratory in 1995-2001. CSS Extension Bulletin E04-32. 8 pages.

Putnam County Home and Garden Soil Test Summary

Putnam County is primarily hilly and rocky. From a height of about 1200 ft. above sea level, the county slopes down to the Hudson River. The county is largely lakes, rock ledge, rock outcroppings and densely forested hillsides, with areas of ecologically significant wetlands (The Great Swamp) and salt marsh (Constitution Marsh), plus interconnected smaller wetlands. Putnam's land use is significantly impacted by New York City Watershed regulations. A mix of suburban, small-scale properties and small-animal farming on 10 acres or less constitutes most land use.

This survey summarizes the soil test results from home and garden soil samples from Putnam 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 209 (see Figure 1). The soil test data for the county are summarized in this bulletin. Percentage summations over multiple categories may not always add to 100% due to rounding errors.

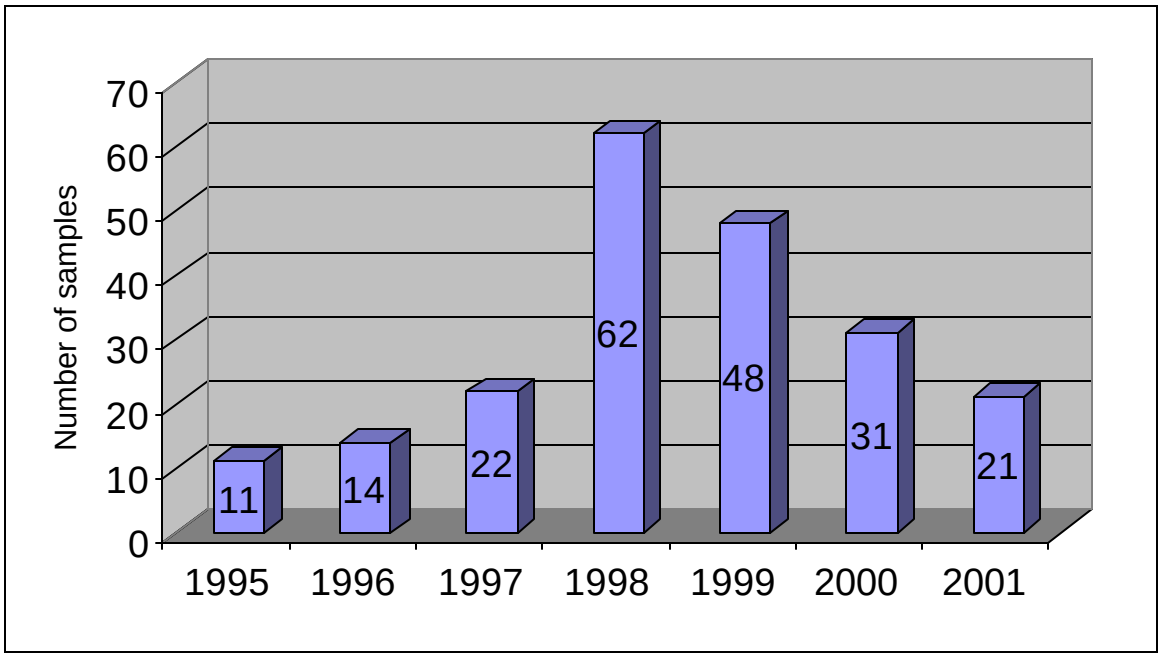

Figure 1: Distribution of Putnam County home and garden samples submitted to the Cornell Nutrient Analysis Laboratory from 1995-2001.

Forty-eight percent of the samples were submitted to obtain soil fertility data and recommendations for lawns. Another 17% and 15% of the samples were analyzed for vegetable gardens and ornamentals adapted to pH 6.0 to pH 7.5, respectively, while others requested recommendations for azaleas, athletic fields, flowering annuals, greens, herbs, perennials, roses, and tree fruits.

The soil types of the home and garden samples that were submitted by people living in Putnam County were classified as silty soils (13%), silt loams (43%), sandy loams (33%) or sands (11%). 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 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)[1]. Thirty-seven percent of the samples had between 3 and 4% organic matter while 30% had organic matter levels between 2 and 3% and 12% tested between 4 and 5% organic matter. Organic matter levels greater than 5% were found in 18% of the samples while 15% contained less than 2% 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 shows examples of ornamentals adapted to low versus higher pH status. The pH values of the Putnam home and garden soils submitted to the Cornell Nutrient Analysis Laboratory varied from pH 4.3 to pH 8.1. Five samples had a pH less than 5.0. Twenty-three percent tested between pH 5 and pH 6 while pH values over 6 but less than 8 were found for 74% of the samples.

Table 2: Ornamentals adapted to a soil pH less than or greater than pH 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, Deutiza, 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.

[1] Samples with very high levels of organic matter and/or nutrients generally indicate organic and/or synthetic amendments rather than soils.

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 Putnam County home and garden samples that were submitted to the Cornell Nutrient Analysis Laboratory between 1995 and 2001, none tested very low in phosphorus. Eighteen percent of the samples tested low in phosphorus while 23% were classified medium and 35% tested high in P. The remainder tested very high in phosphorus. This meant that for 59% 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.

Of the home and garden samples submitted during 1995-2001, 1% was classified as very low in potassium. Eight percent had very low or low potassium availability while 12% were classified as medium in potassium. High potassium availability was identified in 27% of the samples whereas 53% of the samples were classified as very high in K.

Table 3: Potassium classifications depend on soil test K levels and soil management group. See Table 1 for descriptions of the 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

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 Putnam home and garden soils tested high (11%) or very high (87%) for magnesium while only 4 samples tested low or very low and 2 were medium in Mg.

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 209 samples that were submitted, 203 (97%) 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 209 samples that were submitted, 202 (97%) 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, 66% tested high for zinc while 25% tested medium in zinc and 9% were classified as low in zinc.

Reference

- Morgan, M.F. 1941. Chemical soil diagnosis by the universal soil testing system. Connecticut Agricultural Experimental Station. Bulletin 450.