

Soil Sampling and Testing for the Home Landscape or Vegetable Garden¹

Amy L. Shober and Rao Mylavarapu²

Introduction

Plants require 14 mineral nutrients for proper growth and reproduction. For the most part, soil can supply sufficient amounts of these nutrients. However, in some cases, soils may not have enough of one or more essential nutrients to sustain plant growth. Soil testing is the most effective way to determine the nutrient status and pH of the soil in a home landscape or vegetable garden. Soil test results are useful to determine whether fertilizer or lime applications are needed. This publication provides information about taking a soil sample and how to understand the soil test report.

Taking a Soil Sample

In order to obtain reliable results from a soil test, the soil sample must be taken correctly. The soil sample should accurately represent the area that will be planted and managed. The items needed to take a soil sample include a plastic bucket, a shovel (or soil probe), and a paper bag or newspaper. Follow these steps to properly collect a soil sample:

1. Identify the area to be sampled. Turf areas, vegetable gardens and ornamental beds should all be sampled separately. Also, any problem areas (such as depressions, rocky areas, etc.) should be sampled separately to avoid contaminating samples from good areas.

2. Using a shovel (or soil probe), remove soil from 10 to 15 locations within the sampling area. Soil should be removed from the top 6 inches. Walk in a zigzag pattern, stopping occasionally to remove soil for the sample.
3. After taking each sub-sample, remove any plant material or mulch and deposit the soil into the plastic bucket. Mix the soil in the bucket to ensure it is well blended.
4. Spread the soil out on a newspaper or paper grocery bag and allow it to dry thoroughly.
5. Once dry, pack approximately 1 pint of soil (fill to the dotted line) into a soil sample bag (available free from your local UF/IFAS Extension office). Alternatively, you may pack soil into a zip-top plastic bag.

Submitting a Soil Sample for Testing

Soil samples should be analyzed at the UF/IFAS Extension Soil Testing Laboratory (ESTL; <http://soilslab.ifas.ufl.edu>) or other reputable laboratory. The ESTL uses soil test methods that were developed specifically for Florida soils. The lab determines soil pH, lime requirement (“Adams-Evans” buffer test), and an index of available soil nutrients (the “Mehlich-3” soil test). These test methods have been calibrated across Florida and other Southeastern states

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2. Amy L. Shober, former associate professor, Center for Landscape Conservation and Ecology, Department of Soil and Water Sciences, UF/IFAS Gulf Coast Research and Education Center; and Rao Mylavarapu, professor and soil & nutrient management specialist, Department of Soil and Water Sciences, and director, UF/IFAS ANSERV Laboratories; UF/IFAS Extension, Gainesville, FL 32611.

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RELATIONSHIP OF SOIL TESTING TO LAWN MAINTENANCE OR VEGETABLE GARDENING

Single-Element Fertilizers and Complete Fertilizers

People have different opinions about lawn or landscape care or garden productivity because they have different skills, training, and experiences. This diversity shows in the management levels observed in any neighborhood. However, most people are able to grow beautiful lawns and productive gardens by applying the UF/IFAS recommended amount of a complete fertilizer (a fertilizer that contains nitrogen, phosphorus, and potassium). This method of fertilization saves time and effort for most homeowners compared to using single-element fertilizers. If you use complete fertilizers, testing only for soil pH and lime requirement is your best testing plan (Test A). A soil fertility test is worth the extra fee only if you have access to single-element fertilizers and you wish to use more carefully estimated amounts of P and K in your fertilization program (Test B).

As with any chemical, proper handling and application of recommended fertilizer amounts will minimize any potential hazard to you or the environment.

Lime Requirement

Most garden plants respond unfavorably when soil pH is too high or too low. You should test your soil pH every 2–3 years to minimize plant growth problems relating to soil pH. The pH of your soil and a lime requirement test are the only accurate means to determine if your lawn, landscape, or garden will benefit from the addition of lime.

Soil Testing as a Diagnostic Tool

The main purpose behind soil testing procedures is to establish lime and fertilizer needs of a crop before planting. Most research efforts have been directed to that goal. When production problems occur, many people feel that a soil test is the best diagnostic tool. However, soil testing is useful in diagnosing crop production and growth problems only under special circumstances. Make sure to do the following:

1. Consult an expert to help you interpret your soil test results.
2. Ask the expert about other possible causes. In many cases, additional tests are also needed, such as plant analysis, nematode analysis, etc.
3. Maintain complete and orderly records of all management practices.

TAKING A REPRESENTATIVE SOIL SAMPLE

Tools

1. Digging implement, such as a soil probe, a spade, or a regular garden hand trowel (Figures 1 and 2)
2. Plastic bucket
3. Clean shopping bag or some newspaper
4. Soil sample bags for each of your soil samples (one per sample) and a shipping box to send samples to the UF/IFAS Extension Soil Testing Laboratory. Soil sample bags are available for free at your local UF/IFAS Extension office. This office is also a good source of many UF/IFAS publications to help you with lawn care and home gardening.

Sampling

1. Use your digging implement to obtain a small amount of soil from 10–15 spots over the area you wish to test. When you sample a lawn, take soil from the upper 2–4 inches (Figures 1 and 2). Sample a vegetable garden or landscape plants by taking soil from the upper 6–8 inches.
2. As you take each small sample, place it into the plastic bucket (Figure 3). Space your sampling sites throughout the area. Do not include soil from any problem spots in the regular samples. Submit soil samples from problem spots as separate samples.
3. After sampling, mix the soil in the bucket with your hand so that all the soil is well blended.

4. Take about 1 pint of the blended soil and place it on the shopping bag or newspaper to air-dry. Return any soil remaining in the bucket to the lawn or vegetable garden.
5. While the soil is drying, fill out the requested information in the soil test package, both on the form and on the sample bag. A list of the various lawn types and landscape plants for which recommendations are available can be found in Table 1.
6. When the soil is dry, transfer about ½ pint of soil into the labeled sample bag from the soil test package.
7. Include these items in the shipping box:
 - Your labeled soil sample(s)
 - This Landscape and Vegetable Garden Soil Test Form (SL136)
 - A check or money order payable to **University of Florida**. Checks written to other names will not be honored and will be returned, causing a delay in processing the samples.

Mail your sample to:

**UF/IFAS Analytical Services Laboratories
Extension Soil Testing Laboratory
Wallace Bldg. 631, 2390 Mowry Road
PO Box 110740
Gainesville, FL 32611-0740**

Test Results

A soil test report, including notes to help you use these results to your best advantage, will be emailed/mailed to you 3–6 days after your sample arrives at the UF/IFAS Extension Soil Testing Laboratory. Contact your local UF/IFAS Extension office if you have questions about the soil test report.

Table 1. List of lawn types and landscape plants for which recommendations are available. Please record the applicable code numbers on page 1 of this form under Crop Code(s).

Crop Code	Lawns
72	Bahiagrass
73	Bermudagrass
74	Carpetgrass
75	Centipedegrass
76	Ryegrass
77	St. Augustinegrass
78	Zoysiagrass
Crop Code	Landscape Plants and Vegetable Gardens
603	Landscape azaleas, camellias, gardenias, hibiscus or ixora
67	Blueberries
62	Dooryard citrus
602	Woody ornamentals or trees in the landscape
90	Vegetable garden

for many years to ensure that the results are valid under Florida conditions. Private laboratories may or may not use soil tests that are calibrated for our region; therefore, if you choose to have your sample analyzed by a private laboratory, it is important that you know which tests are offered. Additionally, UF/IFAS fertilizer recommendations are specific to the soil tests offered through the ESTL, which is important when interpreting the results. For this reason, UF/IFAS fertilizer recommendations may not be valid if other soil test methods were used, which may be the case with soil test results obtained from a private laboratory.

Soil samples being submitted to the ESTL should be accompanied by a completed *Landscape & Vegetable Garden Soil Test Information Form* (EDIS publication [SL136](http://edis.ifas.ufl.edu/SS187) <http://edis.ifas.ufl.edu/SS187>) and the associated test fee should be paid by an enclosed check or money order. Cash may be used if soil samples are delivered to the ESTL in person. The ESTL offers two soil tests for the home landscape and vegetable garden. Test A (\$3) includes soil pH and lime requirement analyses; Test B (\$7) adds analysis of phosphorus (P), potassium (K), calcium (Ca), and magnesium (Mg). The ESTL does not test soils for nitrogen (N). A reliable N soil test does not exist because the chemical forms of N in the soil are constantly changing due to Florida's warm and humid climate. For more information about how N reacts in the soil, see EDIS publication [SL254 Nitrogen in the Home Landscape](http://edis.ifas.ufl.edu/SS479) (<http://edis.ifas.ufl.edu/SS479>). If using another soil testing lab, you should contact it first to obtain instructions on how to submit soil samples.

Soil Test Results

Once the soil analysis is complete, a soil test report will be mailed (usually within 7 days after the ESTL receives the sample). For a quicker response, provide an email address and report(s) will be sent immediately upon completion of analysis. A copy of the soil test report will also be sent to your local county Extension agent, who you should contact if you have questions or need assistance interpreting the results. Figures 1–3 show an example of a soil test report from the ESTL.

The report includes information about the pH and nutrient availability index (as applicable) for each soil sample. In addition, the soil test report includes lime and fertilizer recommendations for selected lawn and landscape plants (Table 1). Fertilizer rate recommendations for N were determined by scientific research on plant response to N, whereas recommendations for P, K, Ca, and Mg are determined based on the index of nutrient availability (e.g. “low,” “medium,” “high,” etc.) measured in the soil sample.

The lime recommendation is based on the results of the pH and lime requirement test and the optimum pH for the turf or landscape plant species. *Be sure to read the soil test report carefully and thoroughly (including all footnotes).* Also, avoid comparing reports from ESTL with those from private laboratories. Private labs may use different analytical procedures, which may or may not be calibrated to conditions in Florida. Remember, your local UF/IFAS Extension office can answer questions related to soil test results (<http://solutionsforyourlife.ufl.edu/map/>).

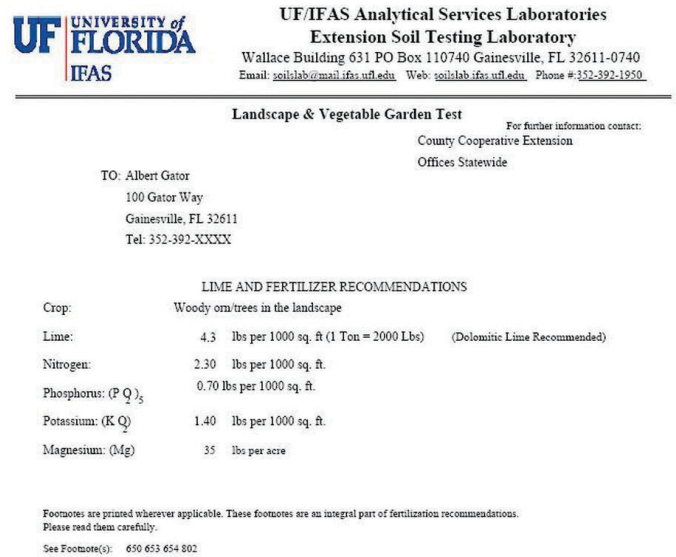


Figure 2. Example of a soil test report from the UF/IFAS Extension Soil Testing Lab.

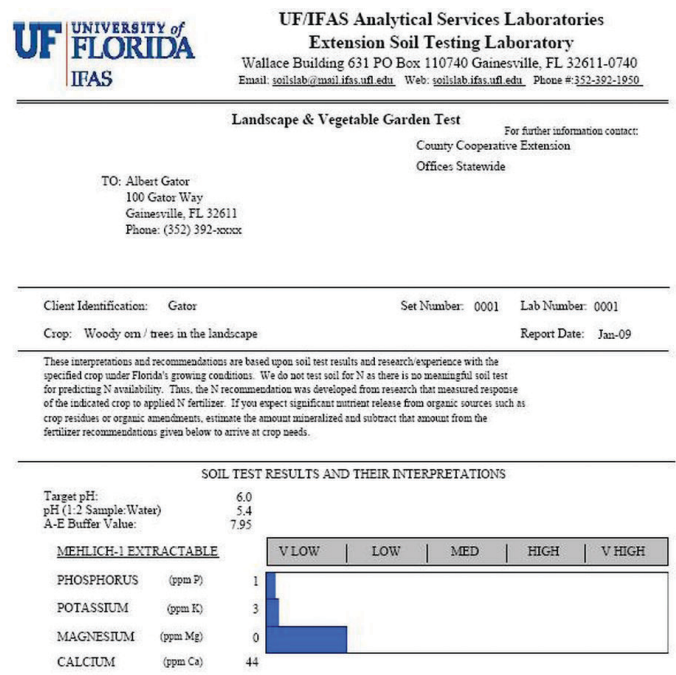


Figure 1. Example of a soil test report from the UF/IFAS Extension Soil Testing Lab.

Foot Notes

1/9/2009

Note #	Description
650	Indicated fertilizer amounts, coupled with nutrients already in the soil, will satisfy the crop-nutrient requirement for this growing season. Fertilizer and water management are linked. Maximum fertilizer efficiency is achieved only with close attention to water management. Supply only enough irrigation water to satisfy plant requirements and minimize leaching conditions.
653	Established trees (more than three to five years since transplanting) do not need routine fertilization. For recently-planted trees, broadcast fertilizer within a diameter of 1.5 times the dripline diameter.
654	Broadcast P2O5 either in one application or as half the recommended amount in each of two applications during the growing season. To minimize leaching losses, broadcast N and K2O in small increments throughout the growing season. Schedule one application every 12 weeks (three times per growing season), adding 33% of the recommended amount of N and K2O at each application. To insure equal coverage when fertilizer rates are small, blend all compatible fertilizers.
802	Recommendations are based on the Adams-Evans lime requirement test which is run on all mineral soils. When the recommended amount of lime is incorporated in the surface 6 inches of soil, soil pH should adjust to a level above which additional liming benefit is not expected. Excessive applications of lime can result in nutritional disorders.

Figure 3. Example of a soil test report from the UF/IFAS Extension Soil Testing Lab.

Table 1. The ESTL provides lime and fertilizer recommendations for seven turfgrass species and nine categories of landscape plants.

Turfgrass	Ornamentals/Vegetables
Bahiagrass	Azaleas
Bermudagrass	Blueberries
Carpetgrass	Camellias
Centipedegrass	Dooryard citrus
Ryegrass	Gardenia
St. Augustinegrass	Hibiscus
Zoysiagrass	Ixora
	Woody ornamentals or trees (general)
	Vegetables

Mailing Address (please print)

Name _____ Date _____

Address _____

_____, FL Zip _____ Phone _____

Email* _____

*Please provide an email address to receive your results faster.

Signature _____

(signature only required for UF personnel for approval of chartfield charges)

**UF/IFAS Analytical Services Laboratories
Extension Soil Testing Laboratory**

2390 Mowry Road/PO Box 110740/Wallace Building 631
Gainesville, FL 32611-0740

Email: soilslab@ifas.ufl.edu Website: <http://soilslab.ifas.ufl.edu>

Landscape and Vegetable Garden Test Form

Note: This lab only tests samples from Florida.

Direct any questions about this test or the interpretation of the results to your local UF/IFAS Extension agent.

Note:

- Consult an expert to determine if plant growth problems require soil testing.
- These samples will not be tested for nematodes, disease organisms, or chemicals other than those listed on this form.
- Commercial producers should use the Producers Soil Test Form SL135 (<http://edis.ifas.ufl.edu/ss186>).

Step 1. Collect samples from your landscape or garden. See the instructions at the bottom of this page.

Step 2. Choose **EITHER** Test A or B, but not both, for all samples.

Test A. The pH and Lime Requirement Test provides the following information:

- Soil pH
- Lime Requirement

Test A is appropriate if you do the following:

1. Use only complete fertilizers (such as 16-4-8)
2. Follow the generic fertilizer recommendations found in UF/IFAS landscape and vegetable garden publications
3. Need only the soil pH test

Test B. The Standard Soil Fertility Test provides the following:

- Soil pH
- Lime Requirement
- P, K, Ca, Mg, S, Cu, Mn, and Zn

Test B will enable you to tailor your use of single-element fertilizers based on existing soil fertility status. However, if you use a complete fertilizer, such as 10-10-10, the extra tests for extractable P, K, Mg, and Ca are of little value.

Fill in all requested information, using one line per sample. Use additional forms for more than 5 samples.

Remember: Choose either test A or B for each sample.

Lab Use Only	Sample ID	County	Crop Code(s) (See back of form)	Estimated Acreage	Cost of Test A	OR	Cost of Test B
					(Circle appropriate amount.)		
					\$3	OR	\$10
					\$3	OR	\$10
					\$3	OR	\$10
					\$3	OR	\$10
					\$3	OR	\$10

Check Money Order Cash Total _____

Please enclose payment and this sheet in the same package as sample(s).

Please make checks and money orders payable to **UNIVERSITY OF FLORIDA**.
Samples will not be processed without payment. Do not send cash through the mail.

How to Sample Your Lawn or Garden

Obtain a small amount of soil from 10 to 15 different spots in the area you wish to test (a minimum of ½ pint). When you sample a lawn, take the soil from the upper 2–4 inches. When sampling a vegetable garden or landscape plants, take soil from the upper 6 inches. If soil is wet, spread soil on clean paper or other suitable material to air dry.



Figure 1. Use a soil probe for faster soil sampling.



Figure 2. If you don't have a soil probe, use a hand trowel, shovel, or other garden tool. Trim out soil of uniform thickness to the recommended depth.



Figure 3. Place 10–15 soil cores into a plastic bucket; mix, dry, and transfer to a bag.