



**Agricultural and Environmental Services Laboratories (AESL)
College of Agricultural and Environmental Sciences
University of Georgia**

UGA Soil Testing Laboratory

Virtual Tour

By
Leticia S. Sonon and Staff
Soil, Plant, and Water Laboratory

Soil sample

- Its journey from the field to the extension office/laboratory and back to the field...



Collection



Submission



Analysis



Recommendation



Healthy crops/ productive farms

Sample delivery to the laboratory

- Soil samples from Extension offices delivered to the lab by postal service, UPS or Fed Ex. Few samples dropped off by clients living nearby.
- Each box is scanned by the lab and reconciled against the courier's record before affixing signature for sample receipt.



Samples are sorted and checked against submission form

- Boxes are opened and samples are counted and matched with accompanying submission form.
- Once paperwork and samples are in order, sample bags are arranged and wire seal tops are removed. This allows quicker drying of samples.



Samples are grouped into sets - 36 samples/set

- Soils are arranged and grouped into 36 in a set box. Each box has an ID that includes the set number, date, and tests required.
- Typically, soil samples from various locations may differ in properties as shown by their varying colors, texture, and amounts of organic matter.



Samples are dried and ground

- Soils are dried at 110°F for 12 hours or until dry in a walk-in oven.
- The next day, soil samples are crushed using a stainless steel grinder and passed through a screen with 2 mm openings (U.S. Screen Series #10).



Unground and ground samples - difference

- Unground and unscreened samples have pebbles, clods, plant parts including roots.
- Ground and screened samples look uniform in size and, therefore, more homogeneous.



Scooping for Mehlich (mineral) extraction

- Mehlich extraction for routine test provides data on phosphorus, potassium, calcium, magnesium, manganese, and zinc.
- The Mehlich extraction uses 4 milliliter (mL) scoop soil and 20 mL Mehlich solution.
- It is important that soils are properly scooped.



Mineral extraction using Mehlich I solution

- The samples are placed on a shaker for 5 minutes. Shaking allows good mixing of soil and solution.
- The mixture is filtered to separate the soil particles from the liquid.

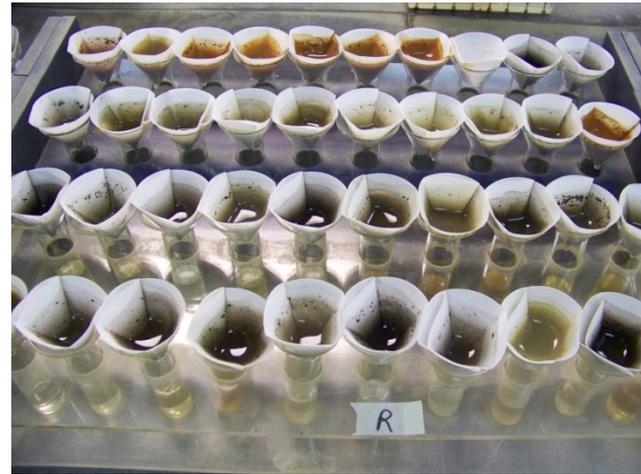


Filtration Step

- Soil particles remain on the filter paper.

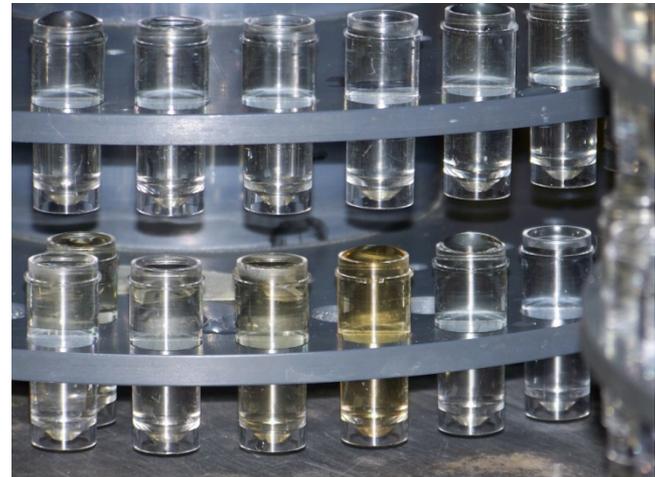


- Clear liquid passes through the filter paper.



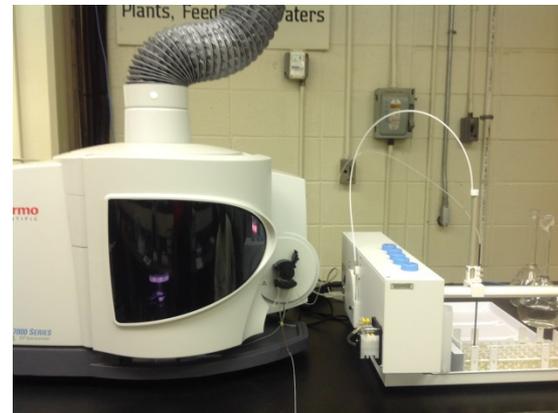
Pouring up Step

- Spent filter papers are removed from filtration flasks, and extracts are transferred to vials.
- The vials are arranged around a carousel following a specific order. This carousel holds soil extracts from check and client samples, duplicate extracts, and blanks.



Analysis of extracts for minerals

- Vials with extracts are loaded on the machine (Inductively Coupled Plasma Spectrometer - ICP) to analyze for phosphorus, potassium, calcium, magnesium, manganese, zinc, and other elements.
- It takes 20 seconds to analyze each extract. The data generated is automatically saved and transmitted to the database for the reporting.



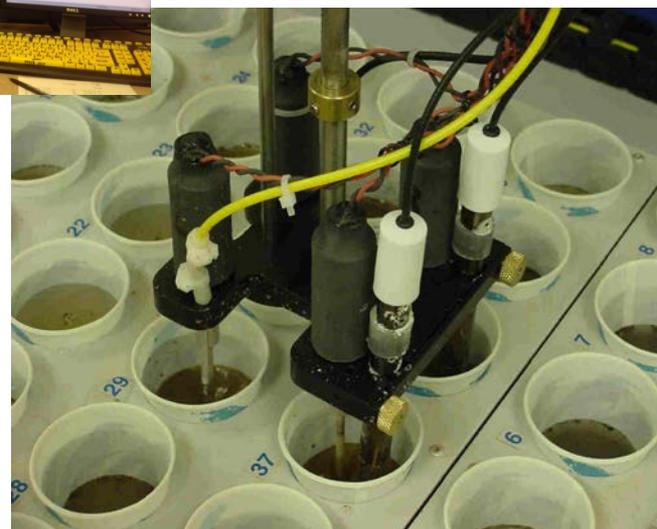
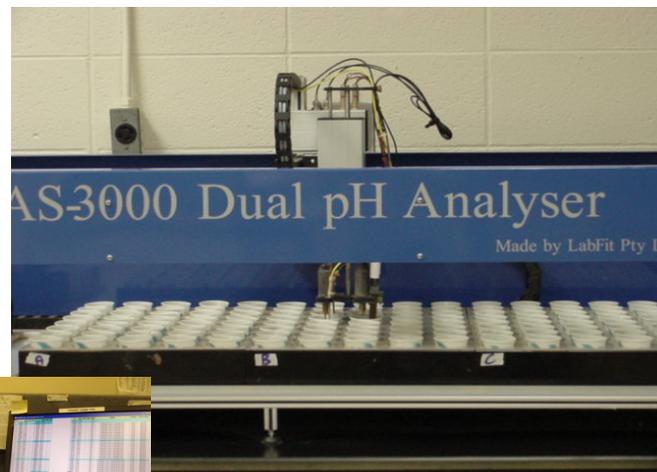
Scooping for soil pH

- Larger soil volume (20 mL) is scooped into Dixie cups. Check soils and duplicates included.
- The set is loaded on the reagent dispenser. Each cup receives 20 mL of 0.01 M CaCl₂.



Robotic pH Meter and Data Handling

- Soil pH sets are loaded on the robotic pH meter. All data generated are automatically saved to the computer.
- pH electrodes are kept clean, calibrated, and properly maintained for accurate pH readings.

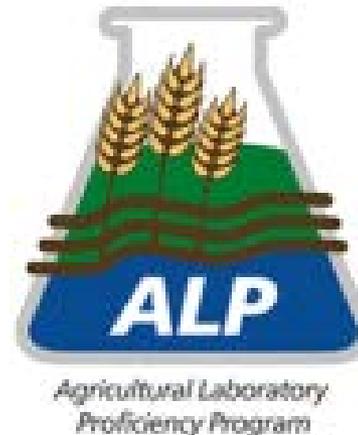


Quality Assurance/Quality Control

- Check soil samples are collected from farmer fields, composited, homogenized, and analyzed many times. Average values are calculated and used in flagging data.

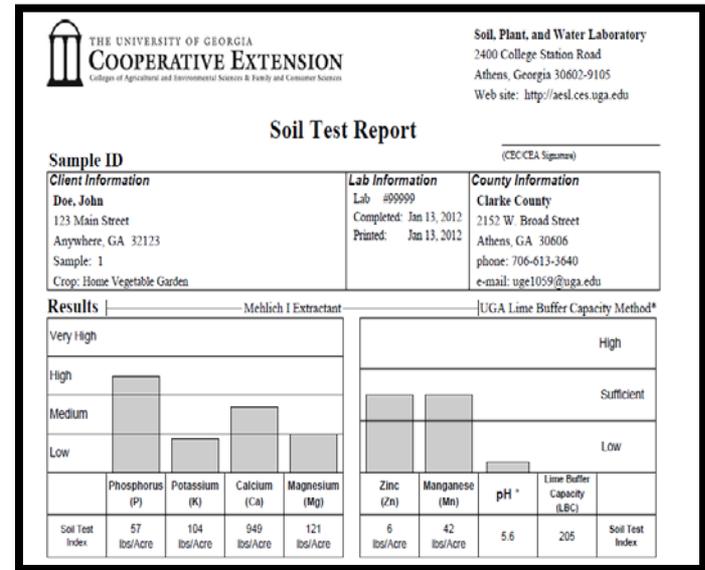


- The AESL participates in several proficiency testing programs to check the quality of its data and operations.

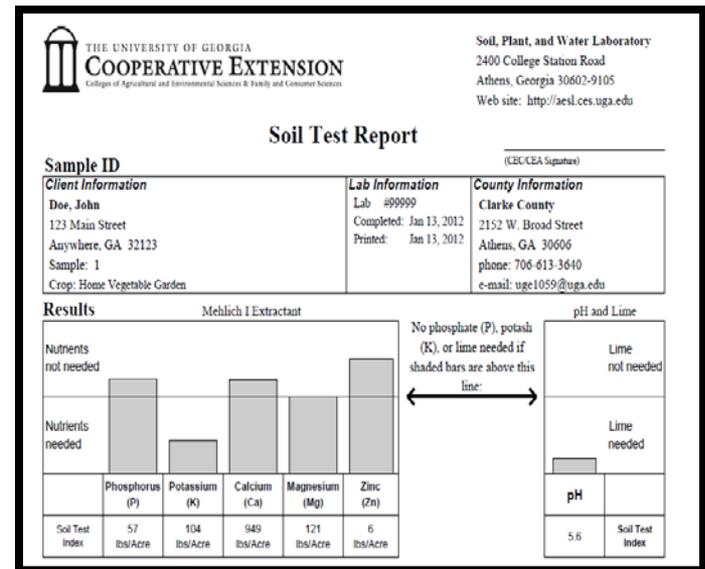


Soil Test Report

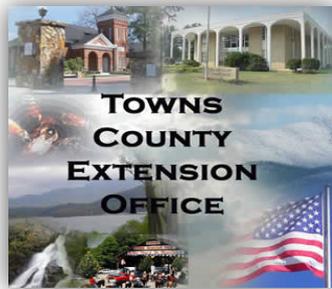
- **Regular farmer soil test report** – bars are labeled low, medium, high, and very high.



- **Homeowner soil test report** – bars are labeled nutrients needed and nutrients not needed.



County Delivery System



Farmer collects samples and submit to extension office.

Extension office sends reports to the client.



Lab releases reports to the extension office.

THE UNIVERSITY OF GEORGIA
COOPERATIVE EXTENSION
Department of Agricultural and Environmental Sciences & Family and Consumer Sciences

Soil, Plant, and Water Laboratory
2400 College Station Road
Athens, Georgia 30602-9105
Web site: <http://aesd.ces.uga.edu>

Soil Test Report

(CSC/CEA Signature)

Sample ID		Lab Information		County Information	
Client Information		Lab #00009	Completed: Jun 13, 2012	Clarke County	
Doe, John 123 Main Street Anywhere, GA 32123		Printed: Jun 13, 2012	2152 W. Broad Street Athens, GA 30606		
Sample: 1 Crop: Home Vegetable Garden		e-mail: uge1059@uga.edu		phone: 706-613-1640	

Results				Mellich I Extractant				UGA Lime Buffer Capacity Method*					
Very High													
High													
Medium													
Low													
	Phosphorus (P)	Potassium (K)	Calcium (Ca)	Magnesium (Mg)	Zinc (Zn)	Manganese (Mn)	pH *	Lime Buffer Capacity (LBC)					
Soil Test Index	57 lbs/Acre	104 lbs/Acre	949 lbs/Acre	121 lbs/Acre	6 lbs/Acre	42 lbs/Acre	5.6	205	Soil Test Index				

Extension office sends samples to the lab; lab receives and check submission.

Lab generates reports with recommendation.



Lab analyzes the samples.



Data Transfer for agents and secretaries

Colquitt County		Announcements	Ag Services Home Page	Submission Forms	County Program Balance: \$21	County Reports	Help & Utilities	Exit
Animal Waste	Feed & Forage	Greenhouse	Microbiology	Nematode Assay	Plant Tissue	Soil	Total Elemental	Water & Ponds

Announcements

Jul 21, 2014
[Revisions in Fishpond Data Interpretation and Recommendation](#)

Jun 30, 2014
[New and Updated Crop Sheets: Olives, Wine Grapes, Home Vegetable Garden](#)

Jan 6, 2014
[New Supply List Order Form](#)

Oct 8, 2013
[Updated Crop Sheets](#)

Apr 25, 2013
[Updated Crop Sheets and Retirement](#)

Mar 28, 2012
[Submission of Onion samples for chemical analysis](#)

Feb 11, 2013
[All Data Transfer clients now available under County Reports Mailing List](#)

Feb 7, 2013
[Changes in crop sheets and plant analysis recommendations](#)

Jan 10, 2013
[Soil Test Mailing List now available under County Reports](#)

UPS CampusShip

Enrollment

This program was initially offered to South Georgia ag counties to keep shipping costs down and get samples to the lab quicker. Currently, there are 45 south and 3 northwest Georgia counties enrolled in the program. Any county wishing to use **UPS pick-up** for the upcoming fiscal year will need to enroll in the **CampusShip** program. This will require payment of **\$500** to the Soil, Plant, and Water Lab.

In order to be eligible for UPS pick-up, your county must contact Michelle Doster at the Soil, Plant and Water Lab as soon as possible:

Email: dmd7096@uga.edu

Phone: 706-542-5350

If we do not receive payment by June 30 or hear from you that a check will be sent, your UPS CampusShip account will be canceled. This applies to counties with existing CampusShip accounts only. If you are enrolled in WorldShip or have a different UPS account, it will not be affected.

UPS CampusShip

Sample weights and box size

- In order to use CampusShip, the county needs a scale to record the weight of the sample to be shipped – a bathroom-model scale is sufficient. This weight must be entered into CampusShip, along with other information, when shipping a package.
- The new UPS rules state that additional handling fees will accrue for the following:
 - if any package's weight exceeds 70 pounds
 - if any package's longest side exceeds 60 inches
 - if the package's second longest side exceeds 30 inches
- Excess charges for packages exceeding these weight and size limits will be billed to the counties.

UPS CampusShip

Reference Code

CampusShip also requires a reference code (see below). There are separate reference codes for each of the Plant Disease Diagnostic Labs at Tifton, Griffin, and Athens, for the Feed and Environmental Water Lab, for the Pesticide and Hazardous Waste Lab, and for the Soil, Plant and Water Lab. Each code is linked to its correct shipping address.

Soil, Plant, and Water Lab - Athens (SPW)	Soil, plant tissue, water, animal waste, sludge, cotton petioles
Feed and Environmental Water Lab - Athens (FEW)	Feeds, forages, foods, feed ingredients, natural waters, industrial wastewater
Pesticides Lab - Athens (PHW)	Insecticides, herbicides, hazardous materials
Plant Disease Clinic - Athens (PDCA)	Christmas trees, commercial fruit and ornamentals, forestry, homeowner samples, legume forages, mushrooms, turf and small grains, urban ornamental landscapes, wood rots
Plant Disease Clinic - Tifton (PDCT)	Tobacco, pecan, cotton, soybean, peanut, corn, kenaf, commercial vegetables
Nematode Lab - Athens (NEMA)	All samples for nematode analysis

UPS CampusShip

Free and non-free shipping

Free shipping only applies to routine soil samples from counties enrolled in CampusShip. Shipping charges for routine soil samples are covered by the \$500 county UPS pickup fee.

The counties must collect fees from the clients to cover shipping charges for all other samples sent to the Soil, Plant and Water Lab (non-routine soils, water, plants, animal waste, etc.), the Department of Plant Pathology, the UGA FEW Lab, and the UGA PHW Lab. This money should be deposited into the county's account. Michelle Doster will bill the county monthly for these shipping charges.

Email soiltest@uga.edu if you have more questions.

UPS Campus Ship

For more information, visit:

<http://aesl.ces.uga.edu/UPSInstructions.htm>



UGA
extension

**Agricultural & Environmental
Services Laboratories**

SPW: 706-542-5350
FEW: 706-542-7690
CEQ: 706-542-9023
Contact: soiltest@uga.edu

CampusShip Quick Reference

Support For questions on logging in, creating shipments, printing labels, or other CampusShip procedures:

- Barbara Crummer
bcrummer@ups.com
404-699-6545

For questions on yearly enrollment, change of office address, or bill disputes:

- Michelle Oster
soiltest@uga.edu
706-542-5350

Running Campus Ship If you haven't received a User ID/Password for accessing CampusShip, contact soiltest@uga.edu. You will usually receive a response within an hour.
If you forgot your password, click the "Forgot your password?" link and follow the instructions.
If you have trouble accessing CampusShip, call their Help Desk number: 1-800-513-1819

1. Log in to <https://www.campusship.ups.com/> with your User ID and Password.
2. **Where is this shipment going?**
Click **Corporate Address Book**, then **Show All**. Select the destination.
3. **Where is this shipment coming from?**
Don't make any changes.
4. **What are you shipping?**
Enter the number of packages, and choose **Other Packaging**.
Enter the weight.
Leave **Package Dimensions** blank unless it's an odd-size package.
5. **How would you like to ship?**
Choose **UPS Ground Service**.
6. **Would you like to add reference numbers to this shipment?**
Enter **Free** if primarily routine soils.
7. **How would you like to pay?**
Don't change. Even though it shows your account, the bills should come to us. Let us know if you get any bills.

Laboratories You may use CampusShip **only** to send samples to the laboratories listed below. Do not click "Enter New Address."
You will be billed for all shipments except routine soils having a reference code of "Free." Refer to sections **Campus Ship Shipping Rates**, **Charging Clients for Shipping**, and **Invoices** below for more information.

Soil, Plant, and Water Lab - Athens (SPW)	Soil, plant tissue, water, animal waste, sludge, cotton petioles
Feed and Environmental Water Lab - Athens (FEW)	Feeds, forages, foods, feed ingredients, natural waters, industrial wastewater
Pesticides Lab - Athens (PHW)	Insecticides, herbicides, hazardous materials
Plant Disease Clinic - Athens (PDCA)	Christmas trees, commercial fruit and ornamentals, forestry, homeowner samples, legume forages, mushrooms, turf and small grains, urban ornamental landscapes, wood rots
Plant Disease Clinic - Tifton (PDCT)	Tobacco, pecan, cotton, soybean, peanut, corn, kenaf, commercial vegetables
Nematode Lab - Athens (NEM)	All samples for nematode analysis

WorldShip and other UPS shipping You may no longer use your account number to run WorldShip or for any other UPS purposes. If you want to continue using WorldShip, you'll need to set up a **new** account, billable to your county office. Contact Barbara Crummer, our UPS Customer Associate, for instructions: phone: 404-699-6545; email: bcrummer@ups.com.
Be sure to tell Barbara that you're enrolled in CampusShip so you won't be double-billed for daily pickup.

Voiding Shipments You must void all invalid shipments or you will be billed. From the left-hand menu of CampusShip's opening screen, click "View History or Void Shipment" and follow the instructions.

Campus Ship Shipping Rates Rates vary by county and destination laboratory. Contact Barbara Crummer (phone: 404-699-6545, email: bcrummer@ups.com) for current rates for your county.

Note that additional handling fees will accrue for the following:

- if any package's weight exceeds 70 pounds
- if any package's longest side exceeds 60 inches
- if the package's second longest side exceeds 30 inches

Charging Clients for Shipping

- Do not charge your clients shipping for routine soils.
- Do charge your clients for all other shipping. Use the CampusShip Rates Chart for guidelines.
- Do not send any shipping money collected to the laboratories. That money stays in your county's account.

Invoices You will receive an itemized bill once every three months for samples submitted to the laboratories. This bill will not include routine soil packages that were marked "Free," unless they exceed package weight or size restrictions listed above under **Campus Ship Shipping Rates**.

If you haven't received a User ID/Password for accessing CampusShip, contact soiltest@uga.edu. You will usually receive a response within an hour.
If you forgot your password, click the "Forgot your password?" link and follow the instructions.
If you have trouble accessing CampusShip, call their Help Desk number: 1-800-513-1819

1. Log in to <https://www.campusship.ups.com/> with your User ID and Password.

2. **Where is this shipment going?**
Click **Corporate Address Book**, then **Show All**. Select the destination.

3. **Where is this shipment coming from?**
Don't make any changes.

4. **What are you shipping?**
Enter the number of packages, and choose **Other Packaging**.
Enter the weight.
Leave **Package Dimensions** blank unless it's an odd-size package.

5. **How would you like to ship?**
Choose **UPS Ground Service**.

6. **Would you like to add reference numbers to this shipment?**
Enter **Free** if primarily routine soils.

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Don't change. Even though it shows your account, the bills should come to us. Let us know if you get any bills.

AESL Website



Agricultural & Environmental Services Laboratories

SPW: 706-542-5350

FEW: 706-542-7690

CEQ: 706-542-9023

Contact: soiltest@uga.edu

Resources

General

- [Locate your County Office](#)
- [Fee Schedule](#)

What's new

- [Southeastern Hay Directory, 2014-2015](#)

Extension Agents & Secretaries

- [Submission Forms](#)
- [Monthly Billing](#)
- [UPS CampusShip](#)
- [Sample Containers](#)
- [Crop Code List](#)
- [Chlorine Test Kit Promotion](#)
- [Hydrogen Sulfide Test Kit](#)

New Tests for Horse Industry

- [Nonstructural Carbohydrates \(NSC\) Circular](#)
- [Horse Test Packages](#)
- [UGFertex](#)
(supports Internet Explorer only)

Publications

- [Soil Test Handbook for Georgia](#)

Quick crop search:

X

- [Crop Code Sheets](#)
- [Feed and Forage Publications](#)
- [Plant Analysis Handbook for Georgia](#)
- [Household Water Quality Publications](#)
- [Soil Test Publications and Tools](#)
- [Quality Assurance/Quality Control](#)
- [More Publications](#)

Online Calculators

- [Fertilization Calculator: N-P₂O₅-K₂O](#)
- [Nitrogen Availability Calculator](#)

Our Services

We provide testing for:

- Soil analysis
- Plant tissue analysis
- Water quality
- Animal Waste
- Feeds and forages
- Biosolids
- Microbiology
- Pesticides and hazardous waste
- Special analysis
- Waste water



Whether you'd like to increase your crop yield, grow healthier roses, test the quality of your drinking water, or make sure your creek isn't polluted, we can help.

To submit samples to the labs, contact your [County Extension Office](#).

If you don't have access to an Extension office, you can order a [Soil Test Kit](#). This is more expensive than taking your samples to an Extension office, but it may be more convenient, especially if you have a small number of samples. It also makes a great gift.



About the Labs

Our Labs

The Agricultural and Environmental Services Laboratories (AESL) are comprised of four cooperating units:

- [Soil, Plant, and Water Lab](#)
- [Feed & Environmental Water Lab](#)
- [Crop and Environmental Quality Laboratory](#)

Our Mission

The mission of the Agricultural and Environmental Services Laboratories (AESL) is to provide objective analytical services to agricultural producers, consumers, and agribusinesses.

- [Read more](#)

Tour our Facilities

If you're ever in the Athens area, we'd love to show you our labs. We can give tours for school groups, Extension agents and secretaries, or other laboratories. Since this is a working laboratory, we need to keep group sizes relatively small, and a tour would not be appropriate for elementary or middle school students.

Send us a message if you would like to [schedule a tour](#).

- [Lab Images](#)
- [Maps and Directions](#)

Lab History

Soil testing is the oldest of the Extension laboratories. It began in 1951 as a mobile laboratory on wheels.

- [Read more](#)



**Agricultural and Environmental Services
Laboratories (AESL)**

Fee Schedule

2015



Athens, GA 30602-9105
Phone: 706-542-5350; Fax: 706-369-5734
<http://aesi.ces.uga.edu>
November 2015

Tools for Agents to Promote Soil Testing by Urban and Non-Farm Clientele in Georgia



Soil test video



Soil test kit



Website



Soil Test Handbook For Georgia



Agricultural and Environmental Services Laboratories



SOIL TESTING KIT



Agricultural and Environmental Services Laboratories
Cooperative Extension, College of Agriculture and Environmental Sciences
The University of Georgia

Soil testing circulars

Soil Testing

*For Home Lawns,
Gardens, and
Wildlife Food Plots*



Background

Developing and maintaining productive soils begin with soil testing. Soils tests provide information on the soil's actual nutrient status. Test results are used to determine the amount and kind of nutrients that should be added for the best growth of lawn, garden, and other types of plants.

Samples should be air dried overnight before sending them to the UGA Soil Testing Lab. Dry samples on a flat surface lined with clean white paper. Care should be taken to avoid contamination. After drying, transfer the sample to the soil sample bag and prepare it for mailing to the lab.

Q: When and how often should soils be tested?

A: Soils can be tested any time during the year. However, allow enough time for the analysis and for fertilizer and lime application. Lime reacts slowly, and if possible, it should be mixed with the soil 2-3 months before planting. Generally, fall is the most desirable time to sample because landscapes and gardens are usually dry and easily accessible.

Once medium or high fertility levels are established, lawn and ornamental areas need to be sampled every two to three years.

Vegetable gardens should be sampled every one to two years.



SOIL TEST KIT

*For Home Lawns,
Gardens and Wildlife
Food Plots*

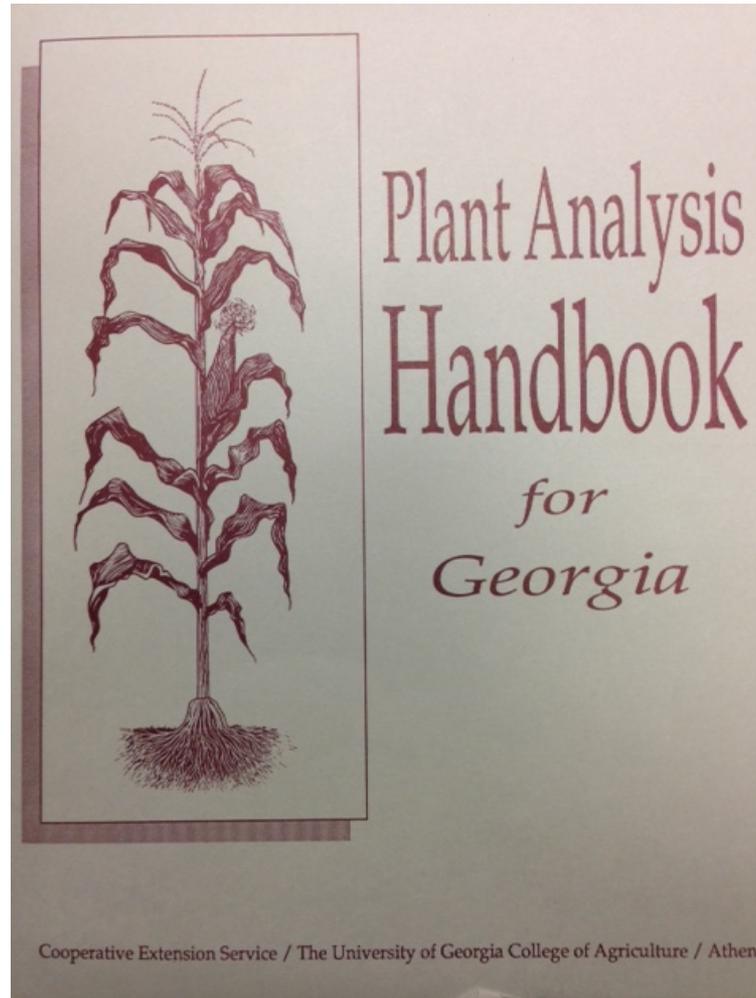


Background

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Plant Analysis Handbook for Georgia

C. Owen Plank, Extension Agronomist - Soil Testing & Plant Analysis, retired



<http://aesl.ces.uga.edu/publications/plant/>

Commonly asked questions

- How much of a sample is needed for analysis? – **Fill line on sample bag**
- Crop code? - <http://aesl.ces.uga.edu/CropCodeList.pdf>
- Where/How do I order supplies? - Order supplies from:
<http://www.caes.uga.edu/Applications/SupplyList/>
- How do I order a soil probe? – **call the Soil Lab 706-542-5350**
- What form do I use when submitting a “special” sample?
<http://aesl.ces.uga.edu/forms/checksub.pdf>
- Is it ok for me to ship a sample on Friday, knowing it won't get to the lab until, at the earliest, Monday or Tuesday? – **it depends on the sample**
 - **Soil for routine – yes!**
 - **Others - No**

Thank you.



- From the AESL Staff