



IPM-1294

Submitting Samples



Alabama Pest Management Handbook for 2023
(Some sections may not be updated for 2023.)
Please see labels for potential changes.)

SUBMITTING SAMPLES FOR DIAGNOSIS, ANALYSIS, AND IDENTIFICATION

The Alabama Cooperative Extension System supports two plant diagnostic laboratories. One is at Auburn University; the other is located in Birmingham at the Birmingham Botanical Gardens.

The Plant Diagnostic Laboratory at Auburn University provides three services: plant problem diagnosis, soil nematode analysis, and insect identification. Plant problems sent to the lab include diseases, nematode injury, insect damage, chemical damage, environmental stress, horticultural and agronomic problems, or wildlife damage.

Plant samples at the Auburn University Plant Diagnostic Lab are initially examined by a plant pathologist. Some samples may then be referred to Extension specialists in entomology, agronomy, horticulture, or wildlife.

In addition to plant problem diagnosis, soil nematode analysis, and insect identification, plants are also received for identification. These plants are referred to agronomists and horticulturists who typically respond to the inquiries.

Weeds for identification should be sent directly to Extension weed scientists. Label the package **WEED ID** and mail to Plant Diagnostic Lab, 961 South Donahue Drive, Auburn University, Auburn, AL 36849-5624. Give the name of the crop infested.

The Plant Diagnostic Laboratory at the C. Beaty Hanna Horticulture and Environmental Center at the Birmingham Botanical Gardens in Birmingham is available to provide plant disease diagnoses to residents of the greater Birmingham area, including Jefferson, Tuscaloosa, Walker, Blount, St. Clair, Shelby, and Bibb counties.

It is extremely important that samples and specimens be collected and packaged correctly for diagnosis and analysis. For example:

- Soil for nematode analysis must not be dried out or too wet.
- Nematodes that have been subjected to extreme temperatures or moisture will die and are not suitable for diagnosis.
- Dried or decayed samples are not satisfactory for diagnostic purposes.
- Plant, soil, and insect samples must be accompanied by the proper information for adequate diagnosis, analysis, and/or identification.

The information in this section explains the proper collecting and packaging techniques needed for an accurate diagnosis. Read it carefully. Then, mail or bring samples and specimens to the following:

Plant Diagnostic Lab
ALFA Agricultural Services & Research Building
961 South Donahue Drive
Auburn University, AL 36849-5624

If you reside in Jefferson or adjoining counties, you may bring or mail samples to the following:

Plant Diagnostic Lab
C. Beaty Hanna Horticulture & Environmental Center
Birmingham Botanical Gardens
2612 Lane Park Road
Birmingham, AL 35223-1802

If possible, mail plant and soil samples during the first part of the week. Samples mailed on Thursday or Friday usually remain in the post office during the weekend. By Monday morning, samples are often decayed or damaged and are not suitable for diagnosis or analysis.

Service charges at the Plant Diagnostic Labs are as follows:

- **Soil Nematode Analysis: \$10**
- **Plant Problem/Disease Diagnosis: depends on work needed**
 - Residential: usually \$15**
 - Commercial: usually \$20**
- **Advanced Molecular Testing: \$30 minimum; charge depends upon specific tests done as per discussion with the client.**
- **Insect Identification:**
 - Commercial/Industrial: \$20.**

The exact charge for plant problem or disease diagnosis depends on the type of diagnostic tests performed. Do not send a check or money with the plant sample; a billing statement will be mailed with the diagnostic report, which is usually sent by regular mail. When requested, the response is made by phone, fax, or e-mail.

PLANTS FOR DISEASE/PROBLEM DIAGNOSIS (2023 UPDATES)

Kassie Conner, *Extension Plant Pathologist*, Entomology and Plant Pathology, and James Jacobi, *Extension Plant Pathologist*, Entomology and Plant Pathology

For an accurate diagnosis of a plant problem, the lab must receive the following:

1. Fresh plant material that is representative of the total problem.
2. Enough plant material for two to three specialists to examine and/or for two to three testing procedures.
3. Information that accurately describes the history of the plant and problem development.

Remember that diagnoses are often based on the visible plant symptoms, associated microscopic structures or other test results, and the information included. If the plant sample is not representative of the actual problem and the information is inaccurate or misleading, the conclusions and diagnoses made in the lab may not be appropriate for the actual problem. The diagnosis can be based only on the sample and information sent to the lab.

Collecting Plant Specimens

1. The specimen must be representative of the problem. If possible, collect the plants intact, including roots, because the above-ground plant symptoms could be caused by a root problem. Dig out—don't pull up—plants. Gently shake off soil but do not wash roots. Wrap roots in a plastic bag to prevent contact of soil with foliage. If you can't collect intact plants, include the plant parts that show damage. If possible, collect several plants or plant parts, such as fruits, nuts, twigs, and leaves, representing different stages of the disease or problem. Do not collect dead plants.

2. After collecting the sample, gently shake off or blot any water droplets that may be present. Wet samples will decay rapidly. Place the sample in a plastic bag immediately and close the bag securely. Do not include any wet or damp paper towels with the samples. If samples must be kept for a time before packaging and mailing, keep them cool.

3. If you suspect a soil problem, send 1 or 2 pints of soil from the affected area and 1 or 2 pints of soil from the non-affected healthy area so that pH, total soluble salt level, and the possibility of nematodes can be checked. Package the soil in a sealed plastic bag.

4. If you suspect a soil nutrition problem, you may send a soil sample directly to the Soil Test Lab. Collect 1 pint of soil from the suspect area. Directions, packages, and forms are available at your county Extension office. Package and mail samples to Soil Testing Laboratory, ALFA Agricultural Services and Research Building, 961 South Donahue Drive, Auburn University, AL 36849-5411. The current charge of \$7 for a routine soil analysis is subject to change.

Call 334-844-3958 or check with the lab at <http://www.aces.edu/anr/soillab/> for more information on soil testing.

5. Check with your county Extension office if you have questions, or check the Plant Diagnostic Laboratories' websites at <http://www.aces.edu/dept/plantdiagnosticlab/> for the Auburn lab and <http://www.aces.edu/plantlabbbham/> for the Birmingham lab. Or, you may contact the labs by phone at 334-844-5507 or 5508 for the Auburn lab or 205-879-6964 (ext. 19) for the Birmingham lab.

Packaging and Mailing Plant Samples

1. Pack the sample well in a sturdy container to prevent crushing. Padded envelopes or boxes are best.
2. Provide as much information as possible. Use the [Plant Sample Submission Form, ANR-0089-A](#) or the [Plant Problem Submission Form, ANR-0089-B](#). These forms (ANR-0089-A and ANR-0089-B) are available from the Auburn and Birmingham websites, respectively. They may also be obtained from your county Extension office. If more space is needed, use additional sheets of paper. The more information provided with the sample, the more accurate the diagnosis and control recommendations will be.
3. If samples must be held for a time before mailing, keep them cool.
4. When sending in a soil sample with the plant sample, always place the soil in a separate plastic bag. Always seal the soil sample bag.
5. The service charge for plant disease/problem diagnosis depends upon the diagnostic procedures needed. The charge is usually \$15 for residential and \$20 for commercial locations, and a minimum of \$30 for advanced molecular testing. Advanced molecular testing is done only after specific discussion with the client. The diagnostic response, recommendations, and an invoice will be mailed directly to you, usually within 7 to 10 days from the time the sample is received. Checks or money orders should be made payable to the Plant Diagnostic Lab.
6. Samples sent from out of state must be double sealed in heavy plastic bags and placed in a sturdy container before shipping. The charge for out-of-state samples is \$30 for residential and \$40 for commercial, which is double instate fees.

Special Handling Techniques for Certain Types of Plant Samples

1. **Lawn or Turf Specimens:** Take the sample from the edge of the affected area. Provide both diseased and healthy plant material. Samples should be approximately 8 to 10 inches square by 3 inches deep. Package samples in a sealed plastic bag. Do not wrap sample in newspaper.

2. **Fleshy Fruits and Vegetables** (apples, peaches, grapes, tomatoes, cabbage, Brussels sprouts, broccoli, etc.): Wrap sample in several layers of dry newspaper. Do not place sample in a plastic bag. Do not include wet or damp towels or paper.

3. **Woody Trees or Shrubs With Cankers or Galls:** Cut three to five branches with cankers or galls. Make cuts several inches beyond the margin of the damage. Be sure to include some living wood.

4. **Woody Shrubs or Small Trees With Wilted Foliage, Dieback, and/or Poor Growth:** Include three to five branches (12 to 16 inches long) showing foliage symptoms, a root sample large enough to fill a quart- or half-gallon-size bag, including larger roots along with feeder roots, and 1 to 2 pints of soil. Package branches, roots, and soil in separate plastic bags. Also, include a soil sample from similar shrubs or trees that appear healthy.

5. **Large Woody Trees With Wilted and/or Dying Foliage and Branches:** Collect branch segments (12 to 16 inches long) that have wilted, dying, or scorched foliage. Be sure the branch segments have some living wood. Look for branches that show any dark brown, black, tan, or greenish streaks just under the bark (in the vascular tissue). Branch segments should be 0.5 inch or more in diameter. Place four to five branch segments in a plastic bag. Be sure to keep the samples cool. A sample of roots and soil may be needed. See number 4 above for details. Include pictures of the damaged tree.

6. **Small Herbaceous Garden Plants or Field Crops:** Collect 10 to 12 whole plants (4 to 12 inches tall) that show symptoms. For plants less than 4 inches tall, collect approximately 20 plants. For seedlings, collect at least 20 to 30 plants. Carefully dig up whole plants and place them in a plastic bag. In a separate plastic bag, send 1 to 2 pints of soil.

SOIL SAMPLES FOR NEMATODE ANALYSIS (2023 UPDATES)
Kassie Conner, *Extension Plant Pathologist*, Entomology and Plant Pathology

Plant parasitic nematodes cause considerable damage each year to garden and field crops. Fruits, lawns, and landscape shrubs also may have nematode problems, but the occurrence is not common. It is a good idea to check gardens and fields for nematodes every 3 years.

Collecting Soil Samples

The best time of the year to test the soil is during late summer and early fall. Collect 1 pint of soil from the root zone area of the plants. Repeat this procedure in 20 or more places in the sampling area which should not exceed 10 acres in size. Divide larger fields into separate 10-acre sampling areas. Thoroughly mix the soil in a bucket and take 1 pint of the mixed soil.

If stunted, yellowed, and stressed plants lead you to suspect a nematode problem, take a soil sample from the area around some plants which are growing poorly. Do not take the sample from soil around dead plants. Always take several soil samples from the root area of affected plants. If sampling soil from one shrub, take the samples from three to five places around the plant. Mix the soil together and remove 1 pint of the sample for testing. Take samples when the soil is moist, but do not use extremely wet or dry soil because analysis from wet or dry soils may test deceptively low. Analyzing soil in winter is generally not recommended.

INSECT SPECIMENS FOR IDENTIFICATION AND ANALYSIS (2023 UPDATES)
Meredith Shrader, *Insect Diagnostician*, Entomology and Plant Pathology**Collecting for Identification**

The identification of an insect is the first step in determining whether it should be controlled and what control measures should be used. Auburn University provides identification assistance when it is needed. A good insect specimen and supporting information are essential for pests to be correctly identified. County Extension offices furnish specific information on what is necessary for collecting, preserving, and shipping specimens and the supporting information that should be included. Please review form ANR-2317 on the Alabama Extension website, www.aces.edu, and send it with any samples.

Preserving and Packaging

Most insects should be preserved immediately after collection. Include several specimens, if possible. Most can be killed and preserved in glass or plastic vials in hand sanitizer

7. Mature Herbaceous Garden Plants or Field Crops:

Dig up two or more whole plants, including the root systems. If the plants are large, cut them into three or more sections so that they may be enclosed in a plastic bag. Also, send 1 to 2 pints of soil from the garden in a separate plastic bag.

8. Mushrooms: Collect several specimens if possible.

Include mushrooms at different stages of growth. Wrap each specimen gently in waxed paper or several layers of newspaper. Package mushrooms in a crush-proof box with a lightweight filler material such as styrofoam chips to prevent damage during transit.

For submission forms, contact your county Extension office or <http://www.aces.edu/dept/plantdiagnosticlab/> or <http://www.aces.edu/plantlabbbham/>.

Packaging Soil Samples

After collecting the sample, immediately place 1 pint of the soil in a plastic bag and seal it. Do not expose it to extremely hot or cold temperatures, and do not allow it to become dry. Place the bag in a nematode soil carton, providing the information requested. Also, fill out the [Nematode Sample Submission Form, ANR-F7](#). Both are available from your Extension agent. Always indicate what crop will be grown and what crop was previously grown. Control recommendations cannot be made without this information.

The service charge for nematode soil testing is \$10 for each sample. Make a check or money order payable to Plant Diagnostic Laboratory. Enclose (1) the sample box or boxes, (2) the information sheet(s), and (3) a check or money order to cover the service charge in a nematode mailing carton available at your county Extension office. Analysis results and recommendations will be mailed 7 to 14 days from the time the soil sample is received. If you have questions, check the website at <http://www.aces.edu/dept/plantdiagnosticlab/> or call 334-844-5506, 844-5507, or 844-5508.

that is at least 70 percent isopropyl (rubbing) alcohol or tissue paper lightly soaked in alcohol. Do not send insects in water. Containers must be leakproof. Wrap the cap with electrical tape to prevent any leakage. Another way to send insects is to ship them "dry" in a squish-proof container, such as a vial or plastic container. The insect must be stabilized with soft padding, such as tissues or cotton balls, so it won't bounce around the container and get damaged.

Spiders and soft-bodied insects such as caterpillars, grubs, and maggots should be placed into hot (nearly boiling temperature) water for a minute and allowed to cool slightly before being placed in hand sanitizer or tissue paper lightly soaked in alcohol. This ensures that some important microscopic features remain visible. Even dead specimens should be so treated. If possible, also take a photograph of the insect to preserve the coloration of the specimen.

Large, fragile insects such as butterflies and moths should be killed in a kill jar or freezer and stored in a crush-proof container without alcohol. Tissue paper gently placed around the specimens will keep them from becoming damaged in the mail. This is the only way to ship these specimens.

Very fragile insects, such as mites, thrips, aphids, and scales, should be packaged and sent in the same manner as diseased plants. These insects are easily damaged by removing them from the plant; also, their appearance on the plant as well as damage symptoms may be important for identification.

Finally, if at all possible, ticks found on humans or pets should be sent in alive. Ticks can be kept alive for several days in a small, loosely capped container with a slightly moistened paper towel or a cotton swab moistened with one drop of water.

SAMPLE PLANTS FOR WEED IDENTIFICATION

(This section has not been updated for 2023. Please refer to labels for potential changes.)

Steve Li, *Extension Weed Science Specialist*, Assistant Professor,
Crop, Soil and Environmental Sciences

To correctly identify weeds, a complete plant or a specimen containing all the leaves, stem, roots, and flowers is absolutely needed. The success of each identification largely depends on the condition of the plant material at the time of identification. Decomposed, wilted, or incomplete plant specimens make identification difficult, if not impossible. Adequate specimens with flowers or fruit structure usually produce positive results. The following instructions will help in the identification process and in making control recommendations.

Collecting Weed Samples

1. Collect and submit intact plants with roots. If the weed is small, collect several plants. Select healthy weeds without physical and insect damage.
2. If the weed has flowers, fruit, or seed heads present, collect plants with those parts and carefully package them.
3. If the weed is too large to submit in one piece, send samples of the roots, stem, leaves, flowers, and fruit individually. Please indicate the size of the plant.
4. For some weeds, especially grass weeds or nutsedge, a sample without seedheads is very difficult to identify. For samples without seedheads, only a general identification can be conducted.

Packaging and Mailing Samples

1. Do not let the plants stay around several days before packaging. If possible, use wet paper towel or cloths to wrap the sample immediately after digging out of the ground.
2. Place the sample in a sealed plastic bag to retain moisture. Pack sealed bag in a sturdy shipping container that is large enough to prevent crushing the sample during transit.
3. If the sample cannot be shipped immediately for identification, store the sealed plastic bag in refrigerator at 35 to 40 degrees F.
4. Label the package for weed ID and send to Plant Diagnostic Lab, 961 South Donahue Drive, Auburn University, AL 36849-5624. Fresh samples may also be submitted to Alabama Extension county offices when shipping weed samples through the mail is not feasible. Additional information should include the following with each specimen:
 1. Location or crop in which this weed was collected. For example, soybean or cotton field, roadside, bermuda pasture, St. Augustine lawn, ditches, pine plantation, orchard, etc.
 2. Any additional information that may influence or assist identification and control recommendation, such as size of the weed; special odor or structure; abundance in the infested area; use of the area and other location information; distance

Include the following information for each sample:

1. Name of collector.
2. County and nearest town.
3. Date collected.
4. Where found, such as on a host plant, animal, or location in a building. If the host was a plant or animal, give its stage of growth. If the specimen was found on a person, provide the person's name and phone number.
5. Degree of infestation (heavy, medium, light) and type of damage.
6. Insecticide used for control and results, if known.

to sensitive plants, creek bank, or fishing pond; availability of irrigation; what pesticide has been sprayed in the past, etc.

Submitting Digital Images

Many smartphones and mobile devices can take high-quality pictures, and these devices are easy to carry and use in field. Pictures taken with smartphones and mobile devices can be directly attached to text messages and e-mails, which increases flexibility and reduces the time needed for identification. Follow these general guidelines to ensure that your pictures meet the requirements for weed identification using digital images.

1. Use appropriate picture size and resolution. Many small or compressed images submitted to Extension weed scientists blur instantly when they are enlarged on screen to analyze certain plant parts.
2. Be sure you have adequate natural or artificial light so the images will not be blurred. Do not take pictures in the field early in the morning or very late in the afternoon.
3. Use a single color background, such as cardboard, foam board, truck tailgate, or a desktop along with measuring sticks or coins to demonstrate the size of a weed and plant part such as leaves or flowers
4. Make sure that the focus point of the camera is on the weed or part of the weed and not on any object in front of or behind the sample. Selecting the focus point can be done by manually touching the plant or plant part on the screen to focus on the area you want to point out. This step is particularly important when the camera gets very close to the weed sample or when several objects are around the focus area.
5. Take one or two pictures to show the overall appearance and size of the weed. A reference object in the picture, such as a water bottle, a notepad, a 5-gallon bucket, or a yardstick, can assist Extension weed scientists in identifying this weed. Other sample pictures should focus on the details of a specific plant part, such as the flower, leaf, root, or stem. Pictures taken from multiple angles will help in the identification process. Put mobile devices physically close to the weed to show details of certain plant parts instead of using the zoom-in function, which often causes blurriness.
6. Use a flashlight, if necessary. However, ambient natural light usually makes samples look the best.
7. Do not compress the pictures too much when you send them through text or e-mail. iPhones and iPads automatically ask users if they wish to send pictures in small, medium, large, or actual size. Choose large or actual size so enlarging pictures is possible during the identification process.

SAMPLES FOR PESTICIDE RESIDUE ANALYSIS (2023 UPDATES)

Sonja B. Thomas, *Extension Specialist*, and Michael R. Curry, Director, Alabama Pesticide Residue Laboratory

Pesticide Safety Education Program

The Alabama Department of Agriculture and Industries operates a state laboratory for special pesticide residue problems related to raw agricultural products and the environment. Samples that originate because of a second party or conflict between landowners or between pesticide applicator and/or landowner(s) should be official samples taken by an Alabama Department of Agriculture and Industries inspector. Call 334-240-7239 with specific details about why an analysis is needed. Arrangements will be made concerning the taking of an official sample. **DO NOT** mail or transport samples to this laboratory.

Water Samples

Private water wells that are contaminated and possibly endangering human health can be handled by the Alabama Department of Environmental Management, Groundwater Section, in Montgomery, Alabama (telephone: 334-270-5655). The director of this section should be contacted because an inspector will be needed to obtain an official sample. **DO NOT** mail or transport samples to this laboratory.

When the owner of a private well suspects contamination by a commercial pest control company, he/she should contact Tony Cofer, (334) 240-7237, for an official sample to be taken by a state agricultural inspector.

Private laboratories are also available for residue analysis. The cost varies depending on the product and tests needed. These labs are located in Alabama's large cities.

Soil and Plant Samples

Pesticide residue analysis is difficult for several pesticides because of their chemical nature and the special equipment needed by the laboratory. An adequate sample is a must. For residue determination, contact Tony Cofer, (334) 240-7237, for an official sample to be taken. All additional information will be collected by the state agricultural inspector.

FOR MORE INFORMATION on pesticides, pesticide safety, or submitting samples for analysis, see the following publications in the IPM series:

IPM 1293, "Safety." Safety contact information; worker protection standards; the safe use, handling, and storage of pesticides

IPM 1295, "General Pesticide Information." Federal and state restricted use pesticide lists; pesticides and water quality

IPM 1317, "Appendix." Pesticide guidelines for agronomic crops, including preharvest intervals; rain-free requirements; grazing restrictions; crop rotation guidelines; and the names, classifications, and toxicities of pesticides.



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