

Sampling

Poultry Litter and Soil for Nutrient Analysis





Poultry litter and soil testing are the foundation of a sound nutrient management program. Poultry litter testing and soil testing are important best management practices (BMPs), and they are essential components of a comprehensive nutrient management plan (CNMP).

Poultry litter is an excellent source of organic nutrients that can be managed properly to provide an excellent source of nutrients for crops. Litter contains nitrogen, phosphorous (phosphate), potassium (potash), organic matter and micronutrients that are essential for crop growth; however, not all litter contains the same amount of nutrients. Book values can provide an estimate of the nutrient value of litter, but the actual nutrient value will vary with bird type, feed composition, feed efficiency, cleanout frequency, type of waterer, management, decaking management or use of litter additives. Therefore, a nutrient analysis of the litter is needed to match to the soil test recommendations and to determine the application rate of the litter.

A poultry litter test should be performed before the litter is applied to the land. For application of litter directly from the house to the land, the litter should be sampled before cleanout. Poultry litter stored in piles should be sampled before land application. Since poultry litter tests should be performed as close to the time of litter application as possible, the timing of taking poultry litter samples and conducting poultry litter tests will depend on the time it will take the laboratory to run the test and return the results to you. Your county agent can help you determine when you need to have your poultry litter sample analyzed and the results returned to you.

A soil test is a series of chemical analyses that provide research-based recommendations for lime and fertilizer application for the specific crops grown on that soil. Over time, soil tests can be used to estimate how much nutrient loss has occurred in the soil. Also, soil tests can identify factors that can limit yield such as high levels of salts or sodium, infiltration rates, surface runoff and ground water quality. A soil test should be performed at least every three years or at the beginning of a different cropping rotation.

Both the poultry litter test and soil test are necessary to determine the nutrient balance between supply and need for your farm. Nutrient balance is a critical component of a CNMP.

The accuracy of poultry litter tests and soil tests, and the value of the results obtained from the tests, are only as good as the samples sent to the lab. Proper collection of poultry litter samples and soil samples that represent the entire poultry house or field must be taken to ensure the accuracy and worth of the poultry litter test and soil test results. Actually, tests performed on poorly taken samples can be misleading.

Poultry Litter Sampling

Poultry litter samples and tests should be performed before litter is applied to land. Take samples as close to the time of land application as possible and in a period in which the lab results will be available when the litter is spread.

In-house Poultry Litter Sampling

Representative poultry litter samples from within a poultry house can be collected by the zigzag method.

Equipment needed:

- Clean 5-gallon bucket
- Narrow square-ended spade or soil probe
- Zipper-closing plastic bag (1 quart)



ZIGZAG METHOD

Procedures:

- Visually divide the house into three sections that run lengthwise of the house.
- In the first section, walk the length of the house in a zigzag pattern, taking subsamples with the spade from at least 10 random points along your path. Take at least 12 subsamples

if you use a soil probe. Be sure to include subsamples from litter under feeders and waterers. **(Figure 1)**

- At each subsampling point, clear a small trench the width of the spade and to the depth of the litter. Remove a 1-inch segment of litter from the top of the litter down to the floor of the house. **(Figure 2)**

If you use a soil probe, insert the probe the entire depth of the litter but not into the dirt floor below the litter.

- Place each subsample into the clean 5-gallon bucket.
- Repeat the subsample collection in the other two sections of the house.
- After the subsamples have been collected from all three sections, crumble and mix the litter thoroughly in the bucket. Or, it may be easier to mix the litter subsamples on a piece of clean plastic or in a clean wheelbarrow.
- After thorough mixing, fill the zippered plastic bag with a sample of the litter.
- Label the sample with the name of the operation, name of the house and the date the sample was taken.
- Secure a Sample Submittal Form, fill it out and enclose the proper payment for the requested analyses.

Figure 1: Broiler House

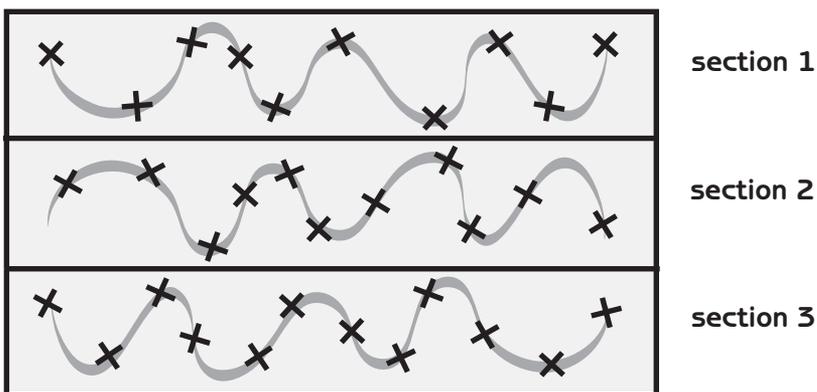
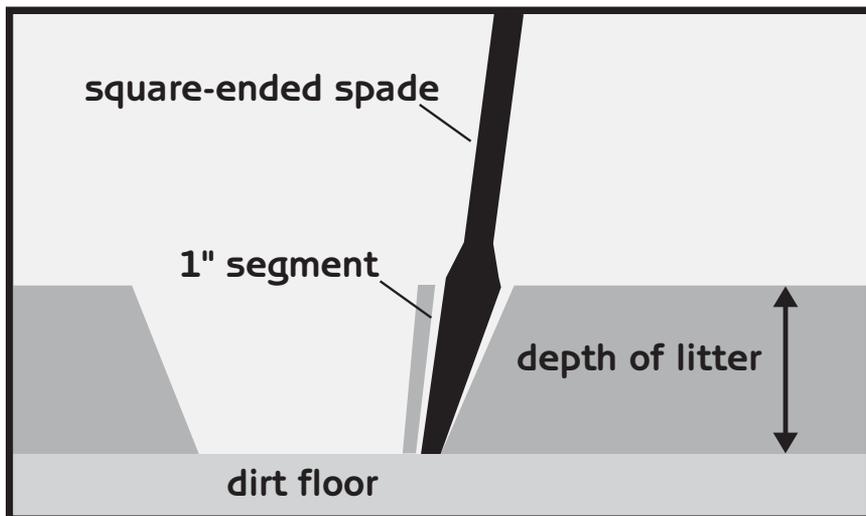


Figure 2: The Litter Sample



Sampling Poultry Litter in Piles

Equipment needed:

- Shovel
- Clean 5-gallon bucket
- Zipper-closing plastic bag (1 quart)



Procedures:

- Select 10-12 widely dispersed points on the pile.
- At each point, remove five shovelfuls of litter and set them aside.
- Mix the five shovelfuls of litter and place one shovelful into the clean bucket.
- Repeat this for all of the 10-12 selected points on the pile.

- After collecting samples from each selected point, crumble and mix the samples thoroughly in the bucket.
- Fill the zippered plastic bag with a sample of litter.
- Label the sample with the name of the operation, pile identification and the date the sample was taken.
- Secure a Sample Submittal Form, fill it out and enclose the proper payment for the requested analyses.

Note: The key to sampling litter piles is to collect multiple samples (*as described above*) at the time the nutrient content of the pile is stable. The nutrient content of the pile should stabilize about two weeks after forming the pile or turning an existing pile.

Handling and Testing Poultry Litter Samples

- Poultry litter samples should be sent to the lab on the same day they are collected.
- If poultry litter samples cannot be sent to the lab on the same day, refrigerate the samples until they can be sent to the lab.
- If samples are mailed, mail them early in the week so they do not sit in the mail over the weekend.
- Do not put the poultry litter samples in a hot spot.

Testing: Request the following laboratory tests for each sample (at a minimum):

- Percent moisture or percent dry matter

- Phosphorous, expressed as % phosphate (P_2O_5)

- Potassium, expressed as % potash (K_2O)

- Ammonium or ammonia nitrogen

- Nitrogen, expressed at % N

Your county agent can help you interpret the results of your poultry litter test.

Soil Sampling

Soil tests should be taken at least every three years and at the beginning of a different cropping rotation. Soil samples should be taken in May, June, July or early August for fall plantings and in late October, November, December or January for spring plants.

Fields need to be divided for the taking soil samples. Field sampling areas need to be separated along slope breaks, soil types, soil series, crops to be planted, crops previously planted, different types of management and prior fertilizer or liming practices. Individual fields make good representative sampling areas if the above listed uniformity conditions are met. Generally, no sample should represent more than about 20 acres, unless the area is uniform.

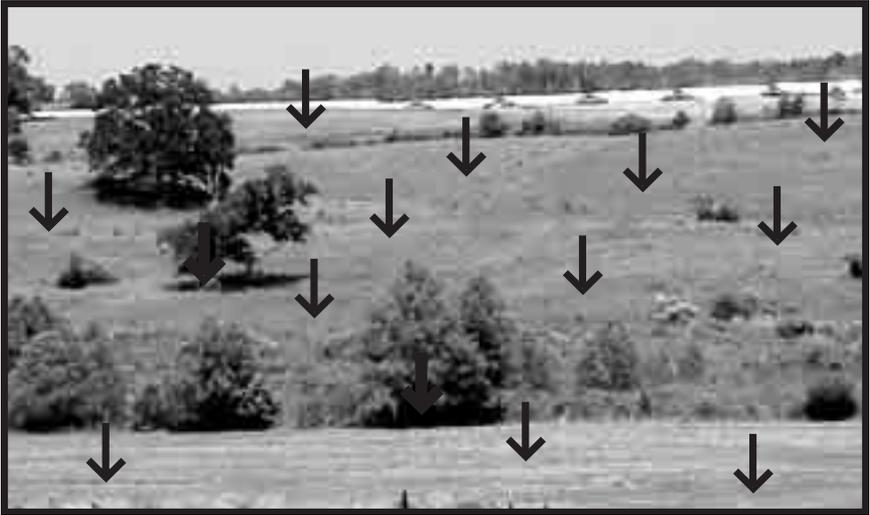
Equipment needed:

- Farm map that includes the boundaries and name for each field
- Soil probe or spade
- Clean 5-gallon bucket
- Zipper-closing plastic bag (1 quart) or soil sample box

Procedures:

- Walk the entire field in a zigzag pattern taking subsamples with the soil probe or spade from 10 to 15 random points along your path. Avoid sampling directly in the fertilizer band. **(Figure 3)**

Figure 3: Field



↓ = indicate sampling points

- If you are using a soil probe, take a 6-inch-deep soil sample.
- If you are using a spade, insert the spade into the ground to a depth of 6 inches, rock the spade back and forth, remove the spade and then scrape soil from the side of the hole for your subsample. *Be sure to collect the sample to a depth of 6 inches.*
- Place each subsample into the clean 5-gallon bucket.
- After the subsamples have been collected from the field, crumble and mix the soil thoroughly in the bucket.
- After thorough mixing, fill the zippered plastic bag/soil sample box with a sample of the soil.
- Label the sample with the name of the operation, name of the field, the crop to be grown and the date the sample was taken.

- Repeat these procedures for each field.
- Secure a Soil Test Request Form, fill it out and enclose the proper payment for the requested analyses.



Handling and Testing Soil Samples

- Soil samples should be sent to the lab about two months before your projected planting date/fertilizer application, to ensure adequate time in planning the fertilization/liming program.
- If samples are mailed, mail them early in the week so they do not sit in the mail over the weekend, also so they can be received by the lab and the lab can get the analysis process started.

Testing: Request the following laboratory tests for each sample (at a minimum):



- *Soil pH*
- *Phosphorous**
- *Potassium*
- *Nitrogen*
- *Organic Matter*

**For samples in Louisiana, the Strong Bray extractant must be used for phosphorous determination.*

Request a routine soil analysis and an organic matter determination. These analyses will give you exchangeable calcium, magnesium, potassium and sodium; extractable phosphorous; and soil pH and lime requirements, if needed. Fertilizer/lime recommendations will be given for the crop(s) to be planted. The organic matter analysis is a special test that will give you the percent organic matter in the soil.

Your county agent can help you interpret the results of your soil test.

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