

# SOIL SAMPLING

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High crop yields and efficient production bring the highest net incomes. However, high-yielding crops require large amounts of plant nutrients that must be supplied from the soil and from commercial fertilizers. Soil tests measure the relative nutrient status in the soil and serve as the best guide to profitable use of commercial fertilizer materials.

One of the major objectives of soil testing is to bring about the more efficient and economical use of fertilizer by the farmer.

### What is a soil test?

A soil test is a chemical method for determining the nutrient-supplying power of a soil. Not all soil-testing methods are alike, nor are all fertilizer recommendations based on soil tests equally reliable.

Reliable fertilizer recommendations are developed by calibrating or correlating laboratory soil test values with crop responses from fertilizer-rate experiments conducted in the field. These correlation test plots are conducted for several years with a particular crop growing on a specific type of soil. If calibration has been incomplete, fertilizer recommendations based on soil-test results still can only be best guesses.

Soil tests do not measure the total amount of specific nutrients in the soil. **Why?** Because **not all the nutrients** in the total supply are in a form readily usable by plants. Thus, there is little relationship between the total amount of nutrients in the soil and the amount of nutrients that plants can get from that same soil.

**Then, what do soil tests measure?** Basically, present soil-testing methods measure a part of the total nutrient supply from the soil. This is the part that is available for plant use.

A low soil-test value for a particular nutrient means that plants won't get enough of that nutrient to produce the highest yield possible for the pre-

vailing soil and climatic conditions. The nutrient deficiency can be corrected by adding fertilizer. The amount of the nutrient that needs to be added for a given soil-test value is determined by correlation test plots as mentioned earlier.

Soil testing can be divided into three categories: (1) taking the sample, (2) making the analysis, and (3) interpreting the results and making the fertilization guide recommendations.

Taking the sample and natural soil variability are probably the most inaccurate of these three categories.

One of the most important steps in a soil testing program is to collect the soil sample that represents the area to be tested. If the sample is not representative of an area, the test results and recommendations can be misleading for the area tested and the nutrients tested for. Thus, it is essential to obtain a representative sample.

Also, remember that soil-test values apply only for the depth of soil sampled.

### When should I take my soil samples?

Soil samples can be taken at any convenient time of the year, but are easiest to take when the soil is workable.

Fall is probably the most practical time of year to sample. Soil moisture conditions are usually favorable and the fields are open. The fall sampling also means the soil test results are returned in time to plan fall and spring fertilizer purchases well in advance of the fall or spring crop.

Spring samples should be taken as soon as possible after the spring thaw so that fertilizer purchases may be planned before planting.

Sampling very dry or very wet soils will not affect soil test results, but it is difficult to collect the soil samples under these conditions. **Don't** sample snow-covered or frozen ground because it is difficult to get a representative sample.

Take the samples about three weeks before you plan to buy fertilizer and/or plant. It usually takes about one week for the results to get back to you from the laboratory.

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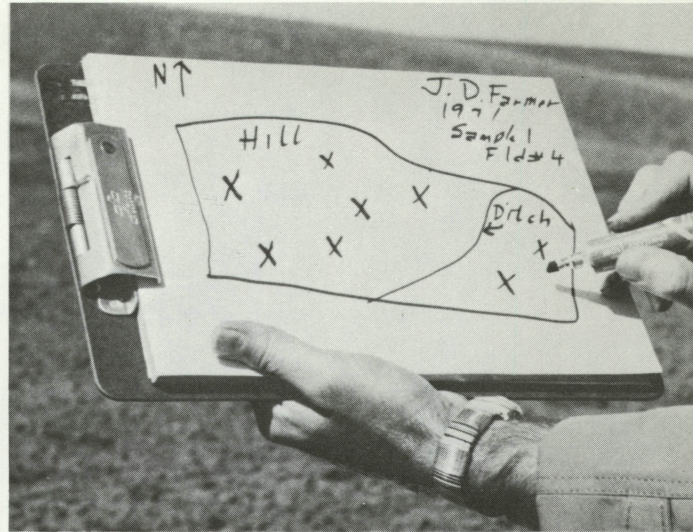
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## HOW TO TAKE SOIL SAMPLES



1. Soil sampling tools and supplies.



2. Sketch showing field and sub-sample locations.



3. Taking a sub-sample with a shovel. Cut 1/2 x 1/2 inch core out of soil slice.



4. Taking a sub-sample with a soil probe.



5. Taking a depth sample with a soil-buck auger.





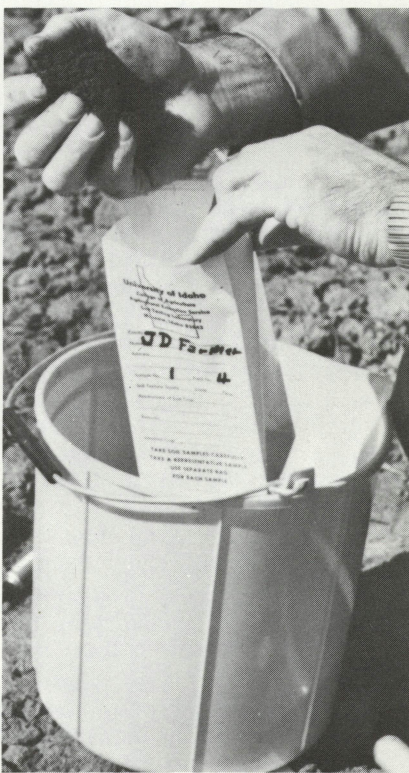
6. Removing a sub-sample from the soil-bucket auger.



7. Composite of sub-samples in a clean plastic bucket.



8. Mixing sub-samples thoroughly. Break up all lumps and clods.



9. Filling sample bag with approximately 1 pint or 1 pound of soil. Be sure you put your name, sample number, and field number on sample bag.



10. Complete soil test report form with name, sample number, field number, cropping history, intended crop, and SOIL TESTS DESIRED.



## How often should I sample?

You should sample your soil at least once during each rotation cycle. But for better soil fertility management, sample each year and fertilize for the maximum potential yield of the intended crop. Sample the whole farm while you are at it; it will save time and expense.

The following procedure will help you collect representative soil samples. (NOTE: Use only clean equipment. **DO NOT** use any tools that have been used in fertilizer or that have fertilizer dust on them. One small grain of fertilizer dust can contribute as much as 200-300 ppm to your soil test results. Use a plastic pail for mixing soil sample. If sampling for micronutrients (zinc, manganese, etc.), use only a stainless steel sampling tool or probe.)

1. **Before sampling a field, size it up for differences in soil characteristics.** Consider its productivity, topography, texture, drainage, color of top soil, past management, cultural practices, cropping and fertilizer history. Make a sketch of the field and use this as a map to designate non-uniform areas that should be sampled separately. The separated area should be large enough to be fertilized as a unit.

2. **Sampling depth will depend on the crop, cultural practices, plow depth, and which nutrients you are sampling for.**

**SURFACE SAMPLE:** The surface sample is usually analyzed for soil reactivity (pH), phosphorus, potassium, organic matter, boron, zinc and sulfur. For cereal grains, the surface sample is usually the 0-12-inch layer. For most row crops, the surface sample is the 0-7-inch layer or plow depth, whichever is deeper.

Take all subsamples at random from the sampling unit, with at least 20 cores or subsamples for each composite sample. If the field has had banded fertilizer applications in recent years, take at least 40 to 50 subsamples. Avoid rows or bands if still evident.

Air dry all soil samples. Break up clods or lumps, spread out in a thin layer about ¼ inch deep and dry at room temperature.

**Caution:** Do not apply artificial drying by oven, stove or furnace as this can alter the sample results.

**DEPTH SAMPLE:** When sampling for nitrogen and sulfur, take samples by 1-foot increments to the effective crop rooting depth. Take 10 or more subsamples, for each foot depth, at random from the sampling unit. If injected or band application has

been used in recent years, use special care to avoid these areas.

**Caution:** Do not include any subsamples from dead furrows, turn rows, fertilizer spill areas, old barn yards, and high organic matter areas.

Keep the samples cool at all times during sampling. As soon as possible after collecting, dry or take them directly to the laboratory. These samples need special handling to insure accurate results and to minimize biological changes. Ask your Agricultural Extension Agent or Agricultural Chemical Dealer for more details concerning special handling of these samples.

If the samples are to be shipped to the laboratory, thoroughly dry them first. Break up all clods or lumps, spread out in a thin layer about ¼ inch deep and dry at room temperature. If a circulating fan is available, position it to move the air over the samples for rapid drying.

**Caution:** Do not dry where agricultural chemical-fertilizer fumes or dust will come in contact with the soil.

When dry, mix the sample thoroughly, crushing any coarse lumps. Take from this about **one pint** or one pound of well-mixed soil and place it in a soil sample bag. (Soil sample bags and soil test report forms are available from your County Agricultural Agent or Agricultural Chemical Dealer.)

Label the bag carefully with your name, sample number, sample depth, and field number. The field number should correspond with your field or farm map showing the areas sampled. This will help you keep an accurate record of your soil test reports.

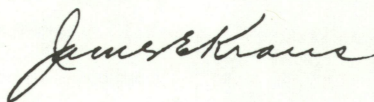
3. **Complete the Soil Test Report Form with all requested information.** Indicate clearly the tests desired (form contains boxed areas for you to use), intended crop, cropping and fertilizer history or any specific problems you are having with the soil sampled. Your name and sample numbers must agree with those on the soil sample bag.

The laboratory cannot process unmarked samples or samples without soil test report forms.

4. **Take the soil sample, soil test report form and soil testing fee to your County Extension Office or your Agricultural Chemical Dealer or mail directly to the Soil Testing Laboratory, Agricultural Biochemistry and Soils Department, University of Idaho, Moscow, Idaho 83843.**

You can get advice pertaining to the various soil testing services, fertilizer guide sheets and other crop production information from your County Extension Office; Soil Testing Laboratory; Agricultural Chemical Dealer; or, Extension Soil Specialist.

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