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Taking Soil Samples

By


Introduction
Taking a representative sample is the most important step in soil testing. A poorly taken soil sample can result in either inadequate or excessive fertilizer use, either of which can decrease net profit. Taking probes of uniform depth and diameter from representative areas of a field will permit an accurate test.

Containers and Information Sheets
Information sheets and suitable containers for sending samples to the laboratory can be obtained from County Agents and most fertilizer dealers. Samples should be securely packaged for shipment by mail. One half pint of soil is enough for testing. Completed information sheets are an essential part of any soil test.

Sampling Tools
Sampling methods differ between various soil tests as to depth, equipment, and the way samples should be handled.

Virtually any tool is suitable for taking shallow samples, used in the conventional soil tests. Some type of closed auger or hydraulic probe, however, is best suited for taking 2-foot nitrate samples. Mounted hydraulic probes are being successfully used in the region for such deep sampling.

Conventional Soil Test Samples
The conventional test analyzes soil for organic matter, phosphorus, potassium, pH, and salt levels. These samples should be taken to a depth of 6-7 inches. Taking samples deeper for this test adversely affects the results. It has been shown that 20 probes per field taken to this depth, when combined and thoroughly mixed, give more accurate tests than when fewer probes are taken. From this 20-probe composite mixture, approximately one half pint of soil should be placed in a container and sent to the testing laboratory. A completed information sheet should also accompany samples. The preferable time for sampling is after maturation of one crop and before seeding the next one. This explains why most sampling is done in the fall or early spring.

Avoid sampling unusual field areas (very low, eroded, dead furrows, or non-representative field areas).

Nitrate Soil Test Samples
This test measures deeper reserves of readily available nitrate-nitrogen plant food. This form of nitrogen can exist in the soil root zone in large quantities yet go completely undetected by the regular organic matter nitrogren test. Samples for nitrate tests must be taken to a minimum of 2 feet. Sampling a field requires keeping the 0-6 inch probes and 6-24 inch probes separate. The normal 20 probes should be taken in each field for both the 0-6 inch and 6-24 inch depths. The 0-6 inch probes should be thoroughly mixed, one half pint of the mixture removed and spread out on paper to air dry at room temperature. DO NOT place in an oven for drying. The same procedure is also followed with the 6-24 inch depth probes. Nitrate soil samples should also be taken in fall, after the crop is mature, or in early spring. A completed information sheet should be sent along with air-dried samples to the testing laboratory. REMEMBER, Do not send moist soil samples for nitrate testing: they must be air dried first! The same 0-6 inch surface sample can be used for conventional nitrate, and other tests, including zinc, if the sample is collected in non-metallic containers and air dried immediately.

Zinc-(Calcium-Magnesium) Soil Test Samples
The zinc soil test requires sampling to a depth of 6-7 inches. Again, 20 probes should be taken per field and mixed thoroughly. Approximately one half pint of soil is then taken from the mixture.

Completed information forms are essential for all soil tests and must accompany sample to laboratory.
Several different tools (including some hydraulic equipment) can be used for taking deeper 6-24 inch as well as 0-6 inch samples and placed in a suitable container. Care should be taken not to collect, mix, or send soil samples in galvanized or similar metallic containers because zinc contamination from such containers will make the results meaningless. A good rule of thumb is to collect all soil samples in a plastic bucket.

**How Often To Sample and Test Soils**

Fields should be sampled and tested only once every 3 to 4 years for the conventional and zinc soil tests. Occasionally, some fields need to be resampled sooner where results from fertilizer applications do not appear to be beneficial. Nitrate samples, however, should be taken at least every other year and preferably every year where continuous cropping is practiced. Under fallow systems, nitrate samples should be taken prior to planting each crop.

**General Field Sampling Guidelines**

Samples should be taken only from the soil area making up the major portion of the field. Avoid the small eroded or depressional areas. Take samples, if possible, before livestock begin grazing stubble or stalk fields, thereby avoiding sample contamination by such nutrient sources. Each past management situation should be considered as a separate field. A field having widely different soils should be divided according to these soils and each soil area sampled separately. This will permit adjustments in future fertilizer use to correct nutrient deficiencies created by previous fertility practices and/or because of inherent soil differences within a field.

Samples for the General and the Zinc Soil tests should be uniformly taken no more than 6 to 7 inches deep.

Mix separately all 0-6 inch probes in one container and all 6-24 inch probes in second container. Then remove a half pint of soil from each mixture and send to laboratory. Soil samples for nitrate-nitrogen, however, MUST be air dried (follow instructions under "Nitrate Soil Test Samples").
Taking samples deeper than 6-24 inches involves handling greater quantities of soil, however, only small amounts of soil at each depth are needed to give uniform samples.

Shallow 0-6 inch surface and 6-24 inch deeper soil probes are collected separately when sampling a field.

It is important to take at least 20 probes per field to get a representative composite sample. Sample in a random manner. Avoid unusual areas or sample these separately.

Several designs of mobile hydraulic sampling equipment are available commercially and are well suited for taking any type soil samples. (Photo courtesy Soil Science, Inc., Fargo, N.D.)
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