

MSU Extension Publication Archive

Archive copy of publication, do not use for current recommendations. Up-to-date information about many topics can be obtained from your local Extension office.

Sampling Soils for Fertilizer and Lime Recommendations
Michigan State University
Cooperative Extension Service
Farm Science Series
John Shickluna, Soil Science Department
September 1965
4 pages

The PDF file was provided courtesy of the Michigan State University Library

Scroll down to view the publication.

SAMPLING SOILS

For Fertilizer and Lime Recommendations

Extension Bulletin E-498 • SEPT., 1965

Cooperative Extension Service
Michigan State University



BY JOHN SHICKLUNA
Soil Science Department

ONE OF THE MAJOR OBJECTIVES of soil testing is to bring about the most efficient and profitable use of fertilizer and lime by the farmer. Information on pH (soil acidity), phosphorus, potassium, calcium and magnesium, along with knowledge of soil type or soil management group and pertinent soil and crop history, enable your agricultural advisor to make recommendations for the most profitable use of lime and fertilizers.

WHEN TO TEST

For general rotation crops, soils should be tested at least once every 3 years. There is a distinct advantage in testing the last sod year of the rotation because lime, if needed, can be applied before breaking the sod. This not only makes for easier spreading and less soil compaction but provides ample time for the lime to become effective before acid-sensitive legumes are again seeded.

Under intensive use, as in gardens and greenhouses, or for high-value field crops, soils should be tested for each crop.

SAMPLE CAREFULLY

Lime and fertilizer recommendations can be no better than the samples tested. Poor samples result in fertilizer recommendations that are misleading. Good samples result in reliable recommendations which can save you money.

Be sure the sample is representative of the area to be treated—the teaspoon of soil which is finally used for analysis weighs 2.5 grams (only .006 pound) in comparison to about 2,000,000 pounds in an acre-furrow slice, 6½ inches deep.

UNIFORM SAMPLING AREAS

Before sampling a field, size it up for differences in soil characteristics. Consider its productivity, topography, texture, drainage, color of top soil, and past management. If these features are uniform throughout the field, each composite sample of the top soil can represent 10 to 15 acres.

If there is a great variation in these features, divide the field accordingly, and take a composite sample from each predetermined area. A composite sample made up of samplings from two distinctly different areas is not representative of either area.

TAKING THE SAMPLE

Soil samples may be taken at any time during the year when temperatures (lack of frost) and moisture conditions permit. It is suggested, due to the variation in nutrient availability that may arise with time of sampling, that any given area be sampled about the same time each year.

From each predetermined area, prepare a composite sample by taking not less than 20 samplings consisting of vertical columns or cores of soil approximately ½ of a square inch in cross section and to plow depth. That is, each sampling should be a vertical column of soil ½ inch by 1 inch by 8 inches deep, or a cylindrical column of soil ¾ of an inch in diameter to plow depth.

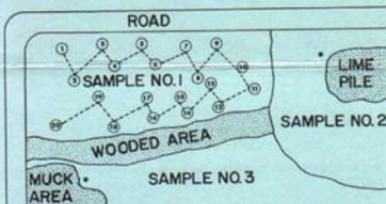
It has been found that 20 well-taken samplings or soil cores per composite sample from a given area regardless of size will result in laboratory tests which can be duplicated much more frequently than where only 5 or 10 samplings comprise the composite

sample. Furthermore, 20 samplings per area appear to give as good results as 40 or even 100 samplings.

Avoid sampling unusual areas unless such locations are sampled and packaged separately — those close to gravel roads, dead furrows, previous locations of brush, lime or manure piles, or burned muck areas.

Subsoil samples taken at a depth of 18 to 24 inches, especially with organic soil, will often aid in making lime recommendations. Subsoil samples need not be a composite.

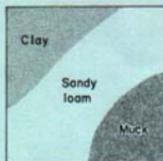
COURSE TO FOLLOW



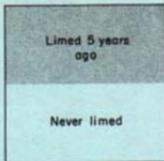
*Omit or take separate samples

In a non-uniform field, as shown above, a minimum of 3 samples are required to adequately represent the area. Sample numbers 1, 2 and 3 represent 3 different soil management groups. This condition is common in glaciated areas such as Michigan.

Each composite sample is made up of 20 borings taken as in sample No. 1.



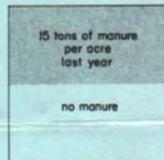
① 3 Composite samples



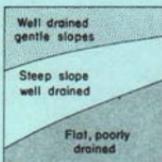
② 2 Composite samples



③ 2 Composite samples



④ 2 Composite samples

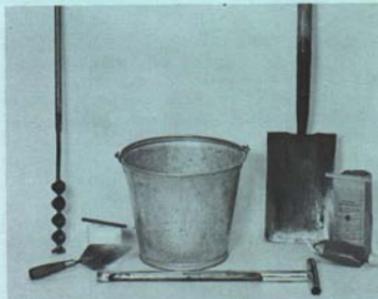


⑤ 3 Composite samples



⑥ 3 Composite samples

SELECT THE TOOLS YOU NEED



◀ Pail: 10- to 12-quart size.

◀ Any one of the following: round pointed shovel or spade, together with trowel or garden dibble; soil auger; or soil sampling probe.

◀ Containers for samples — paper bags (doubled), water proof paper or special soil sample bags or cartons.

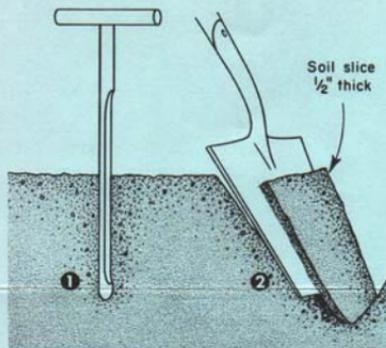
◀ Pencil and sample information sheet.

◀ All equipment and containers should be absolutely clean.

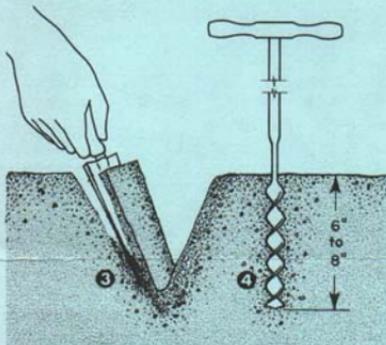
A list of manufacturers of soil-sampling tubes, known to the author, follows:

- American Instrument Co., Silver Spring, Md.
- Arthur H. Thomas Co., Philadelphia, Pa.
- Central Scientific Co., Chicago, Ill.
- Elano Corp., 2455 Dayton-Xenia Road, Xenia, Ohio
- Kerkes Machine and Model Co., (Conner's Screws), 699 Lansing St., Charlotte, Mich.
- LaMotte Chemical Products Co., Towson, Baltimore 4, Md.
- Oliver Corp., 400 W. Madison, Chicago, Ill.
- Olson Mgt. Service, 904 W. Stephenson St., Freeport, Ill.
- Oakfield Apparatus Co., Box 65, Oakfield, Wis.

HOW TO USE SAMPLING TOOLS



1. Sampling probe provides uniform soil cores — easy to use — saves time — best tool for sampling farm soils.
2. A spade or shovel can do the job for the home gardener.



3. Use a narrow (1½ inch) garden dibble to take a slice of soil ½ inch thick.
4. A satisfactory soil auger may be made by welding a 1¼ inch or 1½ inch wood bit into a ½ inch pipe equipped with T-handle.

The representative list of manufacturers and dealers on page 2, known to the author, implies no recommendation or endorsement by Michigan State University of these companies' products.

BREAK CLODS — MIX THOROUGHLY

As the individual samplings are taken, place them in the pail until 20 or more are collected from the area involved. Then mix the soil in the pail thoroughly with the hands and by revolving the pail while held at an angle of 45 degrees.



Using the trowel or similar tool to reduce the sample.



Mix the samplings with the hands.



Rotating the pail aids in mixing.

PREPARING AND PACKAGING THE SAMPLE

After the sample is thoroughly mixed, place a pint of the soil in the container for transferring to the testing laboratory. You can get special containers provided by the Soil Science Department of Michigan State University at your County Extension Office; from fertilizer dealers or salesmen, from lime vendors; or directly from the MSU Soil Science Department. The purchase of the soil container pays for the cost of the soil test.

If these are unavailable, any clean container of one-pint capacity that can be tightly closed should prove satisfactory. But do not use rusty or otherwise contaminated metal cans—any foreign material may affect the soil test.

Changes in nutrient availability in the soil samples, particularly phosphorus, have resulted from drying the soil samples prior to the analysis. Do not force-dry the samples by placing them on radiators or inside ovens before submitting them to the laboratory.

PROVIDE COMPLETE INFORMATION

The more complete the information provided, the better will be the fertilizer recommendation.

Fill in complete information on the soil carton and fill out the accompanying information sheet. Information sheets may be obtained from your County Extension office or from your county Agricultural Stabilization and Conservation (A.S.C.) office.

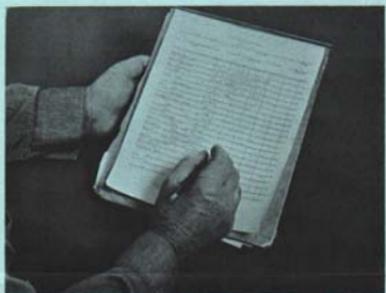
Fill in the information requested on the special soil container, or if an ordinary container is used, label the package with the owner's name and address and the field number. Use a lead or waxed pencil—not a pen.

The following information should accompany the sample:

1. Previous crop grown
2. Crop or crops to be grown
3. When the field was last limed and the rate of application
4. Whether the field will be manured for the crop being grown
5. Depth of plowing
6. Soil type, series or soil management group, name
7. Whether drainage is good or poor
8. Yield goal
9. Whether irrigation is to be used
10. Special problems or conditions



This type of container is available at County Extension offices, the MSU Soil Science department at East Lansing, and from fertilizer and lime dealers.



Information sheets—an essential item in the soil testing program—are available at County Extension offices and A.S.C. offices.

Advice pertaining to the various soil testing services available may be obtained from your County Extension Office.

For interpretation of soil test results and suggestions regarding the amount of plant food to use, refer to Extension Bulletin E-159 entitled, "Fertilizer Recommendations for Michigan Crops."