

SOIL SAMPLING

WHY SAMPLE ?

Soil testing is a useful tool for determining fertility requirements for crops. A regular sampling program can also track the trends and efficiency of a fertilizer program. A soil testing program should be coupled with feed or plant tissue testing for a more complete pool of information from which the producer can make crop management decisions.

The value of the soil test is only as good as the method used to take the soil sample. It is important to be accurate in collecting the samples and in recording information about each sample.

Before sampling, you should consult your British Columbia Ministry of Agriculture, Food and Fisheries crop production guide or the British Columbia soil testing laboratory of your choice for any specific information regarding sampling procedures, sample collecting containers or fees.

WHEN TO SAMPLE ?

In most areas of the province the best time to soil sample is either spring or fall, however, in the South Coastal Region of the province a late spring soil sample is most useful. As a general rule it is best to soil sample a couple of weeks prior to the start of any

seedbed preparation. Perennial crops, such as forage and pasture or berries and tree fruits, should have soil sampling done just prior to the beginning of a new flush of growth in the spring.

In the South Coastal Region, recent research in forage corn has developed the PSNT (or Presidedress Nitrogen Test). This is a soil test to determine the corn crop's sidedress nitrogen requirements. The soil is sampled to 30 cm at the centre of the corn row in late June (when the corn plants are 20 - 30 cm tall). Other work in raspberries (Post-Harvest Soil Nitrate Test) indicates that a late - summer soil test for nitrogen will give the best indication of nitrogen status of the soil and provide an estimate of the crop nitrogen requirement for the following season.

In the regions of the province that are cooler and drier in the winter than the South Coastal Region, fall soil sampling is ideal as it allows the producer to make soil fertility management decisions without having the pressure of an imminent cropping season.

When the nutrient symptoms or other growth problems occur during the growing season, two samples should be taken, one each from the poor growth and the good growth areas. These samples should be rushed to the laboratory so recommendations for any corrective action can be made rapidly.

WHAT TO SAMPLE ?

The following steps should be taken when collecting soil samples.

1. Gather clean sampling equipment including a probe, auger or shovel and at least one plastic bucket for collection and mixing of the cores. When taking samples for micronutrient analysis disposable gloves should be worn to keep sweat from contaminating the sample.
2. Obtain the appropriate soil sampling bags or boxes from the lab of your choice or use small plastic or paper bags.
3. Make a simple map of your farm and identify each field or portion of a field which is to be sampled with a number or letter (Figure 1). An area to be sampled may vary in size from a backyard to no more than 10 hectares. Areas in any field that are different due to appearance, fertilization or cropping practice, soil type, slope, or drainage should be sampled separately. Care should be taken to avoid small, low, wet areas, dead furrows, and areas close to trees, roads and fence lines unless these areas are of particular importance to the sampling program. Do not sample near manure piles (new or old), fertilizer storage or fertilizer bands or livestock droppings. Samples should be taken from fields or portions of fields that are reasonably uniform and can be managed as one unit. (Figure 2)
4. Record all pertinent information about the area sampled as soon as the sample is collected.

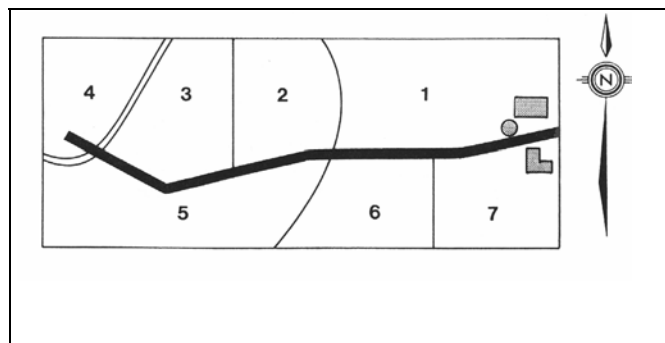


Figure 1

Basic Farm Map Example

This information should include cropping history and desired crops to be grown, any recent fertilizer or soil amendment applications and any information relevant to the reason for the collection of the soil sample.

HOW TO SAMPLE ?

Soil samples are usually taken from the top 15 - 20 centimeters of the soil for most cultivated crops as this is the zone that is normally tilled and contains the major portion of the crop's roots. Sampling should be done with the tool that is most appropriate for the soil conditions. If the soil is stony or wet an auger or shovel will work better than a tube type soil probe. Regardless of the implement chosen, the implement and the sampling bucket should be clean.

To begin sampling remove excess plant residues. When using a shovel create a V-shaped hole and slice a 2 - 3 cm thick slice down one side to a depth of 15 - 20 cm. Trim this slice on either side to form a 2 - 3 cm wide core and place this in the sample bucket (Figure 3). This core is an individual sample that will be used to create the final composite sample.

When using a probe, push the tube into the soil to the desired sample depth and collect the individual sample (Figure 4).

Take 10 to 20 individual samples from each sampling area. For fields up to 10 hectares in size, a minimum of 20 individual samples is suggested.

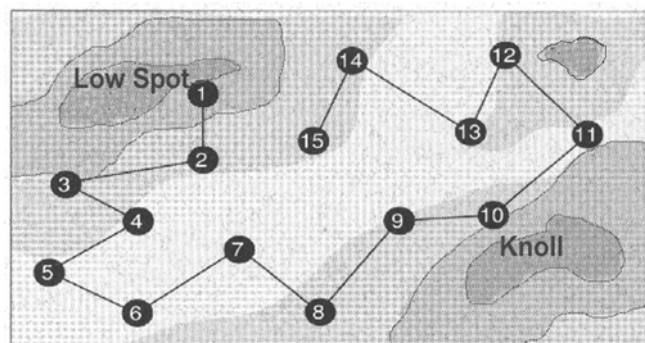


Figure 2

Random Sampling Pattern

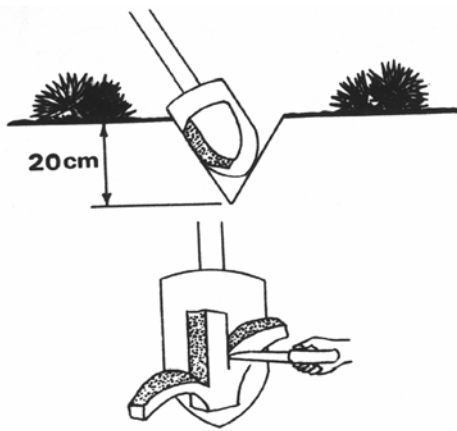


Figure 3 Shovel Method of Soil Sampling

Sampling for specific purposes such as concerns over long term management of defined areas within a field or the impact of soil amendment applications may require modified sample collection procedures. Consult with a professional agrologist on alternative soil sampling strategies.

Once all the individual samples have been collected in the bucket, break up the lumps and remove the stones. Make sure the soil is completely mixed and then remove about 500 grams or 500 milliliters and place this composite soil sample in the soil sample box or bag. It is at this time that any splitting of the samples should be done. The sample container should now be ready to be sealed. The labeling on the sample should be the same as on the rough map of the farm or field for the benefit of the laboratory, producer or farm advisor.

If the sample is quite moist it should be air dried before it is sent to the lab unless it is to be hand delivered within a few hours of collection. Moist samples can incubate in warm conditions such as post offices, bus depots and the inside of warm vehicles thus changing the chemistry of the soil. Soil samples should not be treated like dirt!

When packing the composite samples for shipment ensure they are securely wrapped and that each sample is labeled with a sample number and the name of the farm.

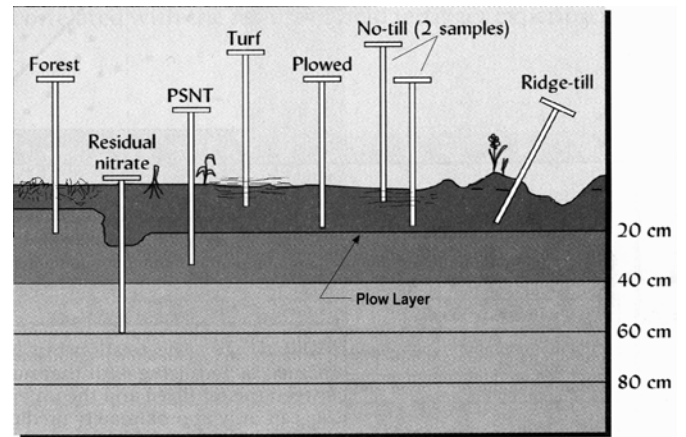


Figure 4 Probe Method of Soil Sampling

The rough field map and all pertinent information regarding the sample should be sent along with the sample, but do not enclose it inside the soil sample box or bag. Keep a copy of all information sent to the lab for your own records.

SUMMARY

Soil sampling is a useful farm management tool but it is important to keep in mind the soil test results are only as accurate as the sampling technique and the records kept on each sample. A good soil fertility program requires regular soil sampling and accurate record keeping, but it may also require feed or plant tissue testing as well. A sampling program that includes the preparation of a farm map each year outlining the location of each sample and the crop management practices that were associated with each field is recommended. Once you have chosen a soil testing lab it is a good idea to stick with that lab, because each individual lab has its own “soil testing philosophy” for the determination of soil nutrient levels and also for the interpretations and recommendations that come from the test results.

NOTE:

15 cm = 6 inches
 30 cm = 1 foot
 10 ha = 25 acres
 500 grams = 1 pound

MONITORING CHANGES IN SOIL QUALITY

Soil testing is a useful tool for monitoring changes to many physical, chemical and biological characteristics of a soil or site. Sampling protocols for baseline monitoring can use the random sampling method described in the previous discussion.

A different sampling procedure is required to observe changes in characteristics which result from the application of organic residual materials or non agricultural waste products. The protocol must be able to assist in the assessment of changes over time and as a result of the addition of the amendment not changes due to the spatial variability of soils present on the application site. An example would be monitoring for heavy metal build up or changes in organic matter concentration.

One such sampling protocol that is recommended is best described as a *modified stratified random sampling system*.

The system requires that at least 3 (preferably 5) discrete sampling points be located and fixed geographically within the site. At each of these sampling points 10 to 20 random sub-samples are collected from within a 3 to 5 meter radius of the point. The sub-samples are collected into one composite sample.

Sampling depths will vary with the parameters or constituents be assessed. ie for heavy metal monitoring 0 - 15 cm and 15- 30 cm, for organic matter concentration only the tillage layer or a depth of 20 cm.

FOR FURTHER INFORMATION CONTACT:

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