

APPENDIX G

Soil and Manure Sampling

Soil testing for total nitrogen, phosphorous and potassium is preferably done each year to determine the kind and rate of fertilizers to be applied to get good plant growth and to prevent over application and consequently "nutrient loading" of the soil, especially nitrogen. Sampling depths of 150 mm (6 in.) for vegetable and forage production and 4 inches for blueberries is usually adequate. Soils in Newfoundland and Labrador are not analyzed for nitrate-nitrogen given the rapid volatilization of nitrate-nitrogen and the non-availability of on-site testing (by the time the sample has been received by the lab, most of the nitrate-nitrogen is lost from the sample).

G.1 Soil Sampling

Reliable results can only be made if the samples are fully representative of the field or area from which they were taken. In addition, proper sampling and handling procedures must be followed.

G.1.1 When to Sample

Soil sampling can be done at any time, but the fall of the year is generally considered the best time for the following reasons:

- ! spring sampling tends to leave one short when requiring fertilizer and limestone recommendations for planting that year;
- ! fall sampling assures you that your results are returned in time for your next planting and allows for planning; and,
- ! early fall sampling allows you to receive results for the fall liming.

G.1.2 Selecting Areas to Sample

Soil sampling is normally done on an individual field basis with a single composite sample representing the whole field. Individual fields that are not uniform should be divided into smaller sampling units with a single composite sample representing each unit. The soil in each of these sampling units should have the same colour, texture, cropping history and fertilizer or manure treatments. Look for differences in slope, erosion, crop growth and yield. Any area that is different in these features and large enough to have manure applied at a different rate should be sampled separately.

Problem areas should not be sampled unless they represent a significant portion of the field. If they do, obtain separate samples. Examples of these areas include:

- ! bottom and uplands soil;
- ! large low or poorly drained areas;

- ! soils of different color and texture; and,
- ! soils for different liming, fertilizing or cropping practices.

All abnormal areas such as old manure piles, dead furrows, areas close to trees or fence lines, haystacks, corrals, fencerows or farmstead sites should also be avoided as well as locations of past chemical or fertilizer spills. Samples should not be taken along headlands, within 15 metres (50 ft) of field borders or shelterbelts or within 45 metres (150 ft) of built up roads.

If the field has been cultivated, take the sample from the compacted soil in the wheel track.

A minimum of 15 sample locations per individual field or sampling unit should be taken. A single composite sample is then formed from 15 or more samples.

G.1.3 Equipment and Supplies

Special augers or probes designed for soil sampling may be used (sample bags and information sheets are available from your local Agriculture Representative's office). However, a clean shovel or garden trowel are both equally effective.

Use two clean, labeled plastic pails for collecting samples. Information sheets, sample containers and shipping boxes are available from the lab conducting the analysis.

If a shovel is used, follow these directions:

- ! Dig a V-shaped hole in the soil and take care to clear away the surface litter;
- ! Take a 12 mm ($\frac{1}{2}$ in.) slice down one side of the hole to a depth of 150 mm (6 in.). Anywhere from 50 to 75 mm (two to three in.) is suitable for sod crops; and,
- ! Trim both sides of the slice to leave a one inch width of soil. This is an individual sample to be placed in a clean pail. Take 5 to 10 such samples and mix them thoroughly to make a representative, composite sample.

Note: All mechanical and hydraulic samplers may yield poor samples on very dry or very wet soils. In all cases, avoid getting the topsoil in the subsoil samples, or subsoil in the topsoil samples. For example, in very dry soils, be careful not to let topsoil spill into the hole before taking deeper samples.

G.1.4 Handling Samples

Take care to keep samples clean and uncontaminated. Clean the sampler and take a couple of dummy samples between fields.

Send samples to the laboratory as soon as possible. If a delay of more than a week is anticipated air-dry the samples. Follow these steps to dry samples:

- ! Mix the soil in each thoroughly, breaking lumps less than 12 mm ($\frac{1}{2}$ in);

- ! Remove about 0.6 litre (1 pint) of soil and spread on a piece of clean paper;
- ! Completely dry at a temperature of not more than 30°C. Do not dry in an oven at a high temperature since this can change the phosphorus, potassium, and sulphur levels;
- ! Care should be taken to avoid contamination of the samples with foreign materials such as commercial fertilizer, manure salt, baking soda, water, dust, etc. Samples should not be dried on old fertilizer or feed bags or in areas where fertilizers have been handled; and,
- ! A fan may be used to ensure constant air flow over samples and enhance drying.

Once the sample is thoroughly dry, fill the soil sample containers. Label each container with the correct field number and sample depth. Complete an information sheet for each field.

G.1.5 Keeping Records

It is wise to keep past records on fields sampled. The records should include:

- ! fertilizer and manure application rates;
- ! previous soil test results;
- ! soil condition at sampling (temperature, moisture, crop cover, etc.);
- ! a map of where the soil samples were taken in each field; and,
- ! production information.

These records may give clues to variations in lab results from year to year, and allow for customizing manure application recommendations.

G.2 Manure Sampling

The most important part of testing manures is getting a representative sample. For liquid manures, agitate or mix the manure in the pit, lagoon, slurry store, or other storage structure before taking samples. If complete mixing is not possible, combine samples taken from 10-15 different areas within the storage pit, combine samples taken at 10-15 different times during the removal of the manure.

Mix these composites and fill a clean 0.6 litre (1 pint) plastic bottle about three-quarters full. Before sealing the bottle with its lid, squeeze the bottle to remove some of the excess air. This allows room for gas expansion during the shipment without excess pressure building up.

For solid manures, take samples from 10-15 different locations of the manure stack or pile or take samples from 10-15 loads of manure when removing and applying manures in the field. Mix thoroughly and place about 0.6 litre or 0.5 kg (1 lb) of the composite manure sample into a clean, heavy duty plastic bag and seal.

For either type of sample, refrigerate the sample overnight or longer and send to one of the provincial

laboratories. It is preferable to ship early in the week and with boxes containing adequate packing to protect the sample containers during handling. Labs will provide sample bottles upon request. Do not use glass bottles.