Information Sheet

7. NUTRITION

7.10 Soil Sampling for Sugarcane

This information sheet i) explains the need for regular soil sampling, ii) describes the correct procedures for taking soil samples, and iii) provides guidelines for ensuring the best fertiliser advice.

Introduction

Soil testing is the only reliable way of determining the amounts and types of nutrients required for production of sugarcane and other agricultural crops. However, for soil testing to be successful there are number of factors that need to be considered. One of them is sample collection. A very small quantity of soil represents thousands of tons of soil in the field. It is therefore important to ensure that the sample submitted for analysis truly reflects the condition of soil in the field. Soil samples that are not taken properly become the weak link in the soil testing process. It is also very important that soil samples are analysed at a reputable laboratory. Our recommendations at the Fertiliser Advisory Service (FAS) laboratory are based on decades of field trial research that have led to accurately establishing nutrient and lime requirements of sugarcane. Our recommendations also ensure sustainability of the farming operation. Fertiliser and liming is an expensive part of the whole production operation. To ensure that it is money well spent, one needs to follow the advice given in this information sheet.

When should soils be sampled?

Samples can be taken at any time of the year. Many of the samples arrive at the laboratory during the winter and early spring prior to planting. If soil samples are submitted in autumn, delays in processing the results can be minimised.

Boxes with soil for analysis can be sent to the FAS at Mount Edgecombe via a courier service, or can be deposited in one of the collection bins that are provided at each Extension Office throughout the industry.

How should samples be taken?

The best way to take top-samples for fertility testing is by using the Beater soil sampler developed by SASRI (Figure 1). The advantages of using this sampler are that it enables samples to be taken at a constant depth of 0-20 cm, and because of the small volume of each core, permits the taking of a large number of samples with the final volume of soil being kept to a minimum.

The actual area from which a single soil sample is taken may vary from one hectare to many hectares. However, the area sampled should have the same or similar soil types and should have had the same management history i.e. treated similarly in terms of fertilisation, liming and green manure cropping or the application of manures. Should the soil type or management histories be different, separate soil samples from the different soil types and areas with varying management practices should be submitted. Avoid ant hills, old roads, and remnants of filtercake and fertiliser dumps when sampling.

Figure 1. The Beater soil sampler

Steps to follow when taking soil samples:

1. After establishing the area to sample, attach a plastic bag onto the soil sampler as shown in Figure 1.
2. Clear away most of the crop residue/mulch (tops and leaf material) and then push the sampler in using the weight of your body with your foot on the sampler to ensure it goes into the full depth, as shown in Figure 2.

Figure 2. Soil sampler inserted in the soil

3. Take the soil sampler out, invert and give it a sharp blow with a wooden peg to ensure all the soil falls through (Figure 3).

Figure 3. The soil sampler hit with a wooden peg.

4. Move to the next spot and repeat steps 2 and 3 until 20 to 30 cores (subsamples) have been taken. NB: ensure that you follow a zig-zag pattern when taking the soil samples (Figure 4).

Figure 4. The Zig-Zag soil sampling pattern.

5. Once you have taken 30 core subsamples, take the sample bag off the sampler and thoroughly mix the soil to ensure a well-mixed homogeneous sample in the packet.

6. Take the FAS sample box and fill it with the well-mixed soil sample and be sure to fill in your name, contact number, grower number, field number and soil depth on the box.

7. Along with the soil sample, fill the soil submission form, making sure that all the important details such as the crop (plant or ratoon), anticipated yield and all grower details are provided. N.B. the field number (sample identification) on the box and on the submission form must be identical!

8. Take the soil samples and submission forms to FAS directly or deposit them in one of the collection bins that are provided by SASRI throughout the industry.

Use the guidelines in this table to ensure correct sampling:

Requirement	Previous fertiliser application or condition	Method of sampling
Single crop advice	Broadcast	Take 30 cores across the field from the interrows only
	Side-dressed along the row	Take one soil core in the row for every eight in the interrow across the field. Take a total of 27 cores.
	Banded in the interrow	Take one core in the area where the band of fertiliser was applied for every eight in the interrow where fertiliser was not applied. Take a total of 27 cores.
Problem patches in field		Separate soil samples should be taken from areas of good and poor growth.

Subsoil sampling

Dryland regions

Besides topsoil sampling, there is also a need to sample the subsoil as sugarcane roots are not restricted to the top 20 cm of soil, but may penetrate to a depth of about a metre or more. However, if there are acidity problems in the subsoil, root development is restricted. The reason for taking subsoil samples is primarily to test for acidity, which if excessive, will restrict root development. Subsoil acidity tends to be problematic only in the rainfed areas of the industry.

To take depth samples we use a screw-in (Dutch) auger. Ideally, depth markings (20, 40, 60 and 80 cm) should be placed on the auger shaft to facilitate sampling to the specified depths (Figure 5).

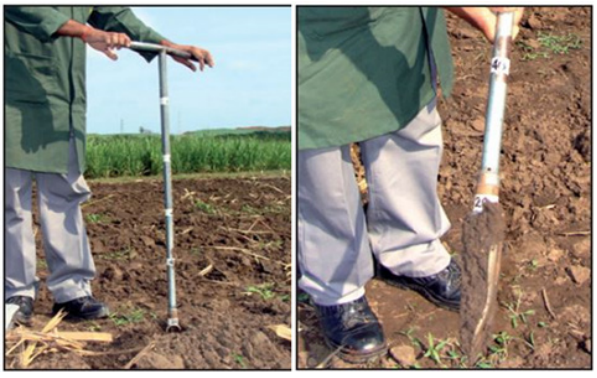

Figure 5. A screw-in (Dutch) auger used to take samples from the subsoil.

When taking the samples, 0-20 cm depth samples are added together as a separate sample, 20-40 cm another sample, etc. up to 80 cm. Since subsoil tends to be less variable than the topsoil (and subsoil sampling is highly laborious), we need to repeat this process only three or four times throughout the field. The samples from individual different depth intervals are put into separate FAS boxes. Make sure that all the sample boxes are properly labelled. Carefully fill the submission form, indicating field numbers and sampling depths) and send the samples to the FAS laboratory.

Irrigated regions

In these regions, subsoil sampling is done mainly to evaluate soil salinity and sodicity which is usually caused by the use of poor quality water for irrigation. This sampling is also done using the screw-in auger shown in picture E. However, the sampling depth intervals for salinity and sodicity are 0-30, 30-60 and 60-90 cm. The samples taken are placed in the separate FAS boxes having all the required information written in the spaces provided and sent to the FAS laboratory for analysis and recommendations, along with submission form.

Additional information

- Samplers can be purchased from FAS.
- Sample boxes and submission forms are supplied by FAS free of charge.
- Consult your Extension Specialist for any further advice you require on soil sampling and related issues.

Remember - Don't guess, soil test!

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