

WHY SOIL SAMPLE

The benefits of soil sampling to the farmer are:

- Establish the current nutrient status of the soil to provide the basis for future strategies.
- Indicate the ameliorants required to correct a soil's physical and chemical imbalances.
- Determine factors that may be limiting crop and pasture production.
- Identify opportunities to improve farm profitability through efficient management of soil fertility levels.
- Develop an appropriate nutrient plan for the farm based on productivity targets.
- Monitor the progress of nutrient strategies and indicate any need to fine-tune inputs.
- Determine the better fertiliser type to apply in particular situations.
- Assists in the planning process through improved budgeting of farm financial resources.

These benefits may result in better farm management through more cost effective nutrient decisions.

WHAT YOU WILL NEED – SOIL SAMPLING EQUIPMENT

- Clean core sampler or hand auger to collect topsoil samples
- Screw driver and clean plastic bucket to remove and collect soil from the sampler
- Avoid touching soil with hands
- Small spade to remove any excessive debris
- Small hand auger for subsoils
- Hydraulic sampler to collect deep soil nitrogen samples
- Sample collection bag, Submission Form, plastic pocket– all available from the Nutrient Advantage Help Desk on 1800 803 453 or your local Incitec Pivot Agent or Dealer.

Many Incitec Pivot Agents have hydraulic samplers, which they provide as a service for their customers.

COLLECTING A SOIL SAMPLE

- Establish appropriate sampling program (see Section A below)
- Ensure the submission form is fully completed.
- The correct sampling and handling procedures must be followed (see Section B below).
- Accurate information is essential.

The report and recommendation are only as good as the sample taken and information supplied.

A. SOIL SAMPLING STRATEGY FOR THE PADDOCK

1. Categorise your paddocks into soil type zones – eg poor/good, black/red, sandy/clay.
2. Sample from the soil type that will provide the most useful interpretation (eg this could be the most dominant soil type or an area where crop production is currently below expectation).
3. **Fallow plant** – Sugarcane soils are traditionally sampled at the end of a fallow, and before preparing a seedbed for the next plant crop. This means that a field may be sampled once every 5 to 7 years, or longer if plough-out and replant is practised.

Sampling at the start of the fallow may be an option. Sampling at this time will allow an assessment of lime and phosphorus requirements. Improvement in these soil conditions may enhance the performance of legume fallow crops, as well as benefiting the next cane crop.

4. **Ploughout-replant** - Soil samples can be taken in plough-out/replant blocks and are best taken immediately the harvest is completed and before the soil is cultivated. This assists in getting a representative sample from an undisturbed soil profile.
5. **Ratoons** – Incitec Pivot is exploring the merit of taking additional soil samples mid-way through the crop cycle, perhaps after first or second ratoon harvest, to enable a re-evaluation of cropping nutrient program. This has special relevance to ratoon crop phosphorus applications, and split applications of lime.

- **Ratoons in “old ground”** – The best indication is obtained with samples taken from the shoulder of the cane row, just out from the cane stool. Field trials to date have shown that in many soil types there is not a lot of variation in nutrient concentrations with soil taken from the shoulder and in the cane row.
- **Ratoons in “new ground”** – Extra care is required where ratoons are growing in relatively recently developed cane ground (the first 2 crop cycles) and the pattern of residual nutrient may be influenced by high nutrient applications at planting. This is especially important for phosphorus and trace elements copper and zinc.

While the best sampling pattern is thought to be as for old ground (above), attention should be given to fertiliser applied at planting with the interpretation of these results. High applications of phosphorus, copper or zinc as basal planting mixtures may not be represented in samples taken from the shoulder of the ratoon row.

Your attention is drawn to this question of obtaining a representative sample in ratoon crops, and the interpretation of soil test values.

6. Study your soil test results and recommendations carefully. Discuss them with your Incitec Pivot Technical Agronomist or local Incitec Pivot Agent. Be sure to review your management practices and crop yield goals. Apply recommendations to the area of concern.
7. Subsoil testing once every 8 years may provide further useful information where problems with soils are suspected.

B. SAMPLING PROTOCOL

TOPSOIL – Take 15 (minimum) cores per sample to 25cm depth

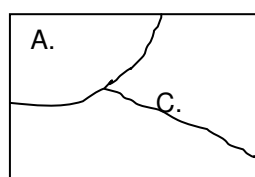
SUBSOIL – Take 15 (minimum) cores per sample to desired depth

DEEP SOIL NITROGEN – Take 8 (minimum) cores per sample from desired sampling depth

Each sample should comprise a minimum of 400gm and a maximum of 1000gm of soil.

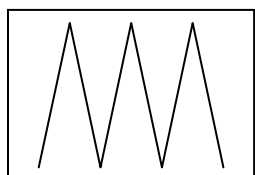
1. Select sampling sites and an appropriate sampling pattern. The following diagrams show some examples.

- **Zone**



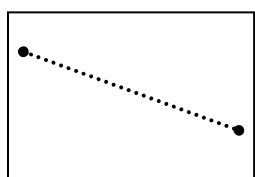
This design is used for changes in soil types and trends across sampling areas (precision farming). Samples are taken from each zone and analysed separately. This design should be adopted in **all** sampling strategies, and should utilise one of the sampling methods below.

- **Zigzag**



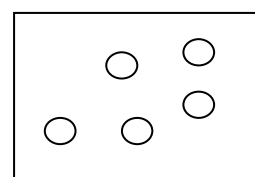
If care is taken this provides good coverage of the sampling area, making it the ideal design for diagnostic sampling. The degree and type of bias vary with experience of operator. Generally use on areas less than 10ha.

- **Transect**



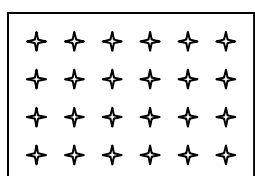
Spot samples are taken at regular intervals along a defined transect. This design allows the same or different operators to repeat the sampling with good precision.

- **Cluster**



This design involves sampling around several points within a sampling area. Where sampling points are defined (dGPS or plotted on map), cluster sampling can produce low variability. However, the results are less likely to be representative of the sampled area. Generally use on large paddocks.

- **Grid**



This design is systematic, with individual samples taken at regular intervals across the sampling area and analysed separately. It is used in precision farming and can help overcome landscape or yield variation, particularly if there is a trend across the sampling area. This design can be expensive if many sampling points are defined.

RECOMMENDATIONS

- Transect sampling is the simplest sampling method and the most practical since the same sample line can be used each season for monitoring fertility trends.
- Cluster sampling produces the lowest variability, but the results are not likely to represent the paddock as a whole.

B. SAMPLING PROTOCOL (continued)

2. Using the corer/auger, take soil sample cores and remove grass and large debris.
3. Place the cores into a clean bucket and break soil into small crumbs.
4. Mix sample thoroughly by tipping sample back and forth between two buckets, or by mixing on a plastic sheet (avoid using hands unless gloved).
5. Use a separate, pre-labelled bag for each sample.
6. After filling with soil, securely seal the bag with the press seal.
7. Areas that should be sampled separately are:
 - Different soil types, topography or paddocks.
 - Areas that have been cropped or fertilised differently.
8. Avoid unusual areas such as:
 - Very wet conditions, stock tracks, windbreaks, fertiliser dump sites or headlands.
 - Areas within 20 metres of fence lines, gates, dams, troughs or trees.
9. Areas that have been fertilised or limed should not be sampled until a minimum of 8 weeks has elapsed since application.

GETTING THE SAMPLE TO THE LABORATORY

1. Ensure that you have 500 grams of soil per sample in each bag. Extra soil is used during preparation time at the laboratory for flushing grinders to avoid contamination.
2. Fill out the appropriate submission form making sure to supply the correct customer account number.
3. Fill out ONE Form for a maximum of three samples taken from the **same paddock** or with the same histories. These samples can be all topsoils, deep soil nitrogen tests or subsoils, or a combination of these test options.
4. Ensure a test code is clearly indicated using the current Nutrient Advantage Price List.
5. Double check that the barcode numbers on the completed Submission Form match the barcode numbers on the sample bags (remember to keep one for your records).
6. Remember that you must supply accurate information so that correct interpretation and recommendation of test results can be made.
7. Place all submission Forms in the clear press seal plastic pocket provided. Place the submission form and soil samples into a Freight satchel and seal deliver to:

**Attn; Sample Preparation
Nutrient Advantage Laboratory
8 South Rd
Werribee Victoria
Australia 3030**

SUMMARY

Soil testing, results in better information about nutrients and soil ameliorants which leads to more effective farm management decisions being possible.

To optimise this outcome, it is important that the soil sampling strategy is carefully planned and the technique accurately implemented.

Remember, the soil analysis results and recommendations are only as good as the original sampling technique and the level of detailed information supplied for the interpretation by the laboratory.

For more information about Nutrient Advantage please contact the Nutrient Advantage Help Desk on 1800 803 453.

Submission forms, soil bags, freight bags and other materials required for sampling are available from the Nutrient Advantage Help Desk or from your local Incitec Pivot Agent. Submission Forms and current Nutrient Advantage product information are available on our website.

www.incitecpivotfertilisers.com.au.