

# SOIL SAMPLING AND ANALYSIS

## TIMING OF SOIL SAMPLING

Sampling to assess soil fertility (ie availability of N and other nutrients) is more effective when performed at the same time each year, preferably before the crop is sown. Where an indication of the N fertilizer requirement is sought, the preferred time to sample soil is from July to September. When fertilizer is to be applied prior to this, a small, unfertilised area should be left from where soil samples can be collected.

## WHERE TO SAMPLE SOIL

A grid or zigzag sampling system is recommended (see Figure 7-1). For fields that are not uniform with respect to soil type, topography, management history or crop growth, the field should be divided into homogenous groups based on these criteria. Separate soil samples should be collected from each area of the field and labelled accordingly. It is often advantageous to sample areas of poor as well as good crop growth where a problem has been observed in previous crops. Avoid collecting samples on sites such as old fence lines, filled in irrigation channels, near trees or old stumps, or if the soil is excessively wet.

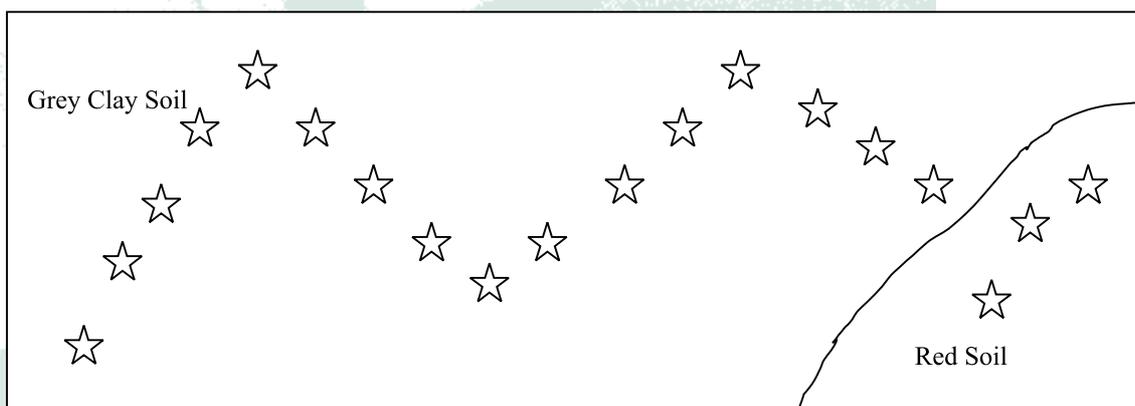
## DEPTH OF SOIL SAMPLING

The recommended sampling depth for irrigated cotton is 30 cm. When sampled from the top of the hill, this procedure provides information from the critical root zone area. For dryland fields that have been fallowed, an additional sample to 1 m may better indicate the amount of nitrate-N stored in the subsoil.

## NUMBER OF SOIL SAMPLES

The number of samples required depends on soil variability within the field. The concentration of most nutrients (especially N and P) can vary widely, even in apparently uniform fields. In general, at least 10 samples should be collected within a 200 ha area. Cores from similar soil types may be bulked (to reduce the cost of testing) and thoroughly mixed prior to sending to a laboratory. About 500 g is required for a comprehensive soil analysis.

*Figure 7-1.  
Example of  
sampling pattern  
for a 200 ha field.*



## SAMPLING TECHNIQUE

A shortened coring tube, similar to those used for inserting neutron probe access tubes is often the most effective method of collecting soil samples. This can be performed quickly by hand. An augur is the next option, but slower. If these tools are not available, then a shovel and a ruler could be used where sampling is required to a depth of 30 cm.

Soil samples should be sent to the laboratory on the day they are collected. If this is not possible, they should be dried at low temperature (<50°C) as quickly as possible to minimise chemical changes which occur during storage or transit. Soil samples can be dried in a low temperature oven or spread on plastic sheets in the sun.

Special care is required when determining soil nitrate, which is easily lost from the soil through microbial activity. Soil samples that cannot be dried immediately should be frozen until they can be dried.

## PACKAGING SAMPLES

To ensure soil samples are not contaminated, put them in unused plastic bags, seal with heavy-duty rubber bands and label each bag with a permanent waterproof marker. It is useful to keep note of pertinent information such as; field number, date sampled, sample depth, soil structure (good, poor, compacted), cropping history etc. A map grid reference for each sample may be useful so that each chemical analysis forms part of a larger database and subsequent samples can be collected from the same site. If more than 500 g of soil is collected, reduce the amount of soil by mounding the soil into a cone shape on a clean plastic sheet, divide into four and discard opposite quarters.

## INTERPRETING SOIL TESTS

To interpret soil nitrate analyses, use NutriLOGIC to estimate the N fertilizer requirement. Refer to the 'NutriLOGIC – predicting N fertilizer requirements of cotton' chapter in this manual.

For other nutrients, consult the tables in the 'Interpretation of soil, petiole and leaf analyses' chapter of this manual, which indicate critical values for the nutrients analysed with various extraction methods. This will indicate whether a particular nutrient is deficient or in excess. Note: various laboratories use different soil testing procedures (eg extracting solutions) which indicate different levels of nutrient availability. They may also report those values with different units to other laboratories.

## SOIL TESTING LABORATORIES

Contact your local rural merchandise supplier. They can organise the samples to be sent for you and will deal directly with laboratories. Ensure the laboratory is registered by the National Association of Testing Authorities (NATA), Australia.