Cotton Catchment Communities CRC
NSW DEPARTMENT OF PRIMARY INDUSTRIES

COTTON *TALES*

Southern New South Wales

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Soil Sampling Guidelines for Cotton and other Summer Crops

Monitoring of soil nutrient status is highly recommended on a field by field basis to manage soil fertility and to avoid nutritional stress of crops as well as identifying soil properties that could limit production.

Soil analyses

Monitoring changes in soil fertility over time is just as valuable as using soil test results to indicate fertiliser requirements. Soil testing for the macronutrients: nitrogen, phosphorus, potassium and sulphur can assist in determining fertiliser strategies as the relationships between soil test nutrient concentration and plant response is more clearly defined for these nutrients. It is recommended that, in both cases, soil is collected from the same site over years to identify changes/trends. Sites can be identified with GPS. This is particularly important if long term management strategies, such as increasing soil organic carbon, are being implemented so that changes over time can be measured.

Timing

Soil sampling is best done May to August in fallow soil or at least a couple of weeks before fertiliser application in back to back crops.

Depth

Sampling 0-30cm is ideal for all nutrients, particularly N, P and K and salinity and sodicity indicators. Sampling 30-60cm is also recommended as many mobile nutrients (particularly N) can move below 30cm.

Sample subsoil (30-100cm) for sodicity, salinity, nitrate and chloride at least every 5 years.

Where to sample

Ideally sample in the same place over subsequent years. Sample close to the plant line or the middle of the bed. However, it is important to avoid sampling fertiliser bands especially where immobile nutrients such as phosphorus, zinc or potassium have been applied.

Number/distribution of cores

This depends on field uniformity. The more variable the field the more samples are required. Field information such as yield maps, biomass images, soil chemistry and electromagnetic (EM) surveys can help identify field variability and aid site selection. Depending on field variability, sampling may be based on:

- Location that represents the majority soil type of the field
- Locations that represent high or low yielding areas
- Particular soil characteristics. E.g. areas of red soil may be sampled separately to areas of grey soil.

Sample handling and storage

Most of the soil processes that affect nutrient availability are in some way related to soil water content and temperature. To ensure that a soil sample accurately reflects the soil nutrient status at the time of sampling, these processes need to be controlled by modifying moisture or temperature conditions. After collection, samples should either be cooled (below 4°C) or dried (48 hrs @ 50°C) to stop any processes that could change the nutrient status of the soil. If samples are cooled to below 4°C it is important to ensure they are kept cool in transit and arrive at the laboratory within 48 hours. If transport will take longer than 48 hours to arrive at the lab it is recommended that samples are oven dried (48 hrs @ 50°C) first. If samples require storage for extended periods of time then oven drying or freezing are the most appropriate methods of storage.

Laboratory selection

Much of the lack of confidence in soil and tissue nutrient analyses is due to the variability in results from laboratories. The lab selected should use standardised accepted laboratory methods. This increases the accuracy of interpretation as it is more likely that critical concentrations and calibrations will have been generated to reflect Australian conditions. It is also recommended that the laboratory be involved in an accredited laboratory proficiency program and have an externally audited quality assurance program.

The Australasian Soil and Plant Analysis Council (ASPAC) is an independent international organisation consisting of individuals, laboratories, research and commercial organisations involved in soil and plant analysis. ASPAC conducts regular National Quality Assurance Programs to enhance standards of analysis and assist standardisation of soil and plant analytical methods across laboratories. A list of all certified ASPAC labs can be found on their website www.aspac-australasia.com.

When monitoring changes over time consistency is the key. Consistency of site, laboratory and nutrient test are essential.

Limitations

Soil analysis only gives a general indication of the status of micronutrients such as copper, zinc, iron, manganese and boron. Often, there is no strong relationship between a soil test result and an application rate for micronutrients. At best, the lower the concentration of the micronutrient below a critical value the more likely you are to see a response to the application of fertiliser.

Micronutrients are more accurately assessed by analysis of leaf blades, as the concentrations are many times higher in the plant tissue than soil and thus, easier to detect.

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