

In season nutrition monitoring

While most growers in Central Queensland use soils analysis to help make nutrition decisions prior to planting, once the crop is in the ground there is limited monitoring of crop nutritional demands. In crop testing can be used to:

- make decisions about in crop applications of nutrients
- to identify suspected deficiencies and
- monitor the success of nutrition programs to inform decisions for the next crop.

One of the limitations of in crop monitoring is the limited window in which to respond to in crop demands and, with CQ's variable climate, applications can be delayed by weather.

Where a nutritional problem is suspected, sample healthy and unhealthy leaves separately to help identify the problem

When conducting in season nutrition monitoring avoid areas of plant stress (eg. waterlogging, lack of water, insect or disease problems). Don't take samples if the crop has recently been sprayed with a pesticide or foliar fertiliser.

Samples need to be handled and managed carefully including use of clean dry hands or gloves to prevent contamination i.e. salt from sweat, sunscreen products (zinc), transport containers containing contaminants. Send samples on overnight courier, or follow laboratory instructions for drying. Avoid sending samples over weekends. Testing laboratories need to be accredited and use standardised accepted methods

Petiole analysis is used early in crop development (up to flowering) to monitor and determine the nitrogen and potassium status. Results allow time to adjust nutrient management programs and correct deficiencies before crop development is substantially affected. Petiole analysis is not recommended for other nutrients.

Benefits

- Measure and monitor nitrogen levels in the crop up to flowering
- Can be collected reasonably early in the season which allows time to respond.

Limitations

- Not recommended for other nutrients
- Not reliable beyond flowering
- Requires 3 consecutive samples 10 days apart (approximately 600, 750, 900 day degrees) preferably with similar moisture status for comparison.
- Leaf blades need to be removed in the field

- Weather conditions (cold weather, water logging, low radiation due to cloudy weather) affect nutrient levels.

- Water stress can influence results

Sampling

Sample the youngest mature leaf, normally 4th or 5th unfolded leaf from the top of the plant. Sample at least 50 petioles systematically across field from average sized plants. Leaf blades must be immediately removed from the petiole. Three samplings approximately 10 days apart are required to give a good indication of the rate of change in the nitrogen and potassium in the petioles (best done at 600, 750 and 900 day degrees from planting). It is imperative that the stage of growth (days after sowing or more accurately, day degrees) is noted

Leaf analyses can be used to identify nutrient imbalances, deficiencies and toxicities. Leaf analysis has been calibrated for cotton. Critical concentrations of all nutrients have been identified at all stages of development, so leaves can be sampled throughout the growth of the crop. Leaf analyses can indicate how effective the fertiliser management has been for that crop/field and, in conjunction with soil testing, help fine-tune the fertiliser program

Benefits

- Monitor all nutrient levels in plant
- Identify imbalances, deficiencies and toxicities
- Can be more precise than soil testing in particular for micronutrients
- Assist in optimising fertiliser programs

Limitations

- Leaves can be sampled from squaring to boll fill. This means there is less opportunity to respond to crop nutritional demands based on leaf sample analysis. For example, application of nitrogen is not recommended after flowering. Little or no yield response is achieved, although the crop may become visibly greener. Late application of nitrogen can encourage rank growth, reduced fruiting and make crops difficult to defoliate.
 - Weather conditions can influence testing results
- Interpretation of results is complex and depends on a number of influencing factors, most importantly crop stage of development

NutriLOGIC is an on-line program that independently interprets cotton leaf analyses. You can enter the laboratory data, as well as sampling data and sowing date, and the program reports whether each nutrient is in the optimum, deficient or excess zones for the development stage of the crop. The reports can be stored and printed. [www.\(link to NutriLOGIC\)](http://www.linktoNutriLOGIC.com) – part of CottAssist