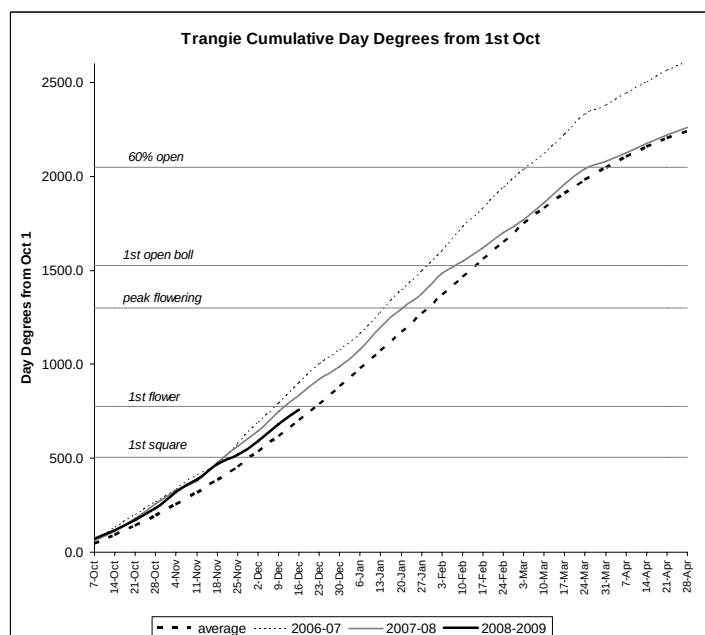




Evaluating in crop nutrient status

Plant analyses taken during crop growth can indicate nutrient deficiencies which, if identified early enough, may be rectified by applying the appropriate fertiliser.

Both petiole and leaf tissue tests can be used to evaluate crop nutrient status. Petioles are ideal for monitoring nitrate-N and potassium concentrations until mid-flowering but are not recommended for other nutrients. Of the other nutrients, petioles normally contain about half of the concentrations found in the leaf blade, but this varies, making them less reliable as a sampling tool. Beyond flowering, leaf tests are a better method of monitoring crop nutrition.

Petiole sampling

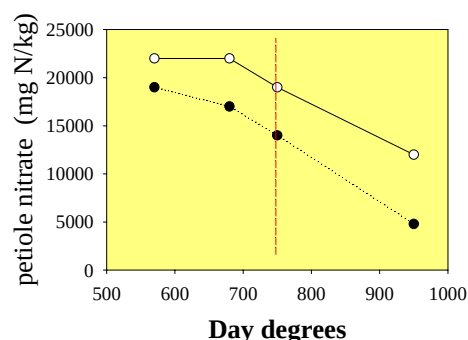
For nitrate monitoring, three samplings, approximately 10 days apart, give a good indication of the rate of change in nitrate-N in petioles. Sampling is best done at approximately 600, 750, 900 day degrees from sowing.

Collect approximately 50 petioles (more if they are thin and short) from the youngest fully expanded leaf (generally the 4th to 5th node from the top). The leaf blade must be removed immediately in the field to prevent transfer of nutrient from the petiole to the leaf blade. Water stress, either drought or waterlogging, cold weather, low radiation through cloudy conditions all affect nutrient levels, but particularly in petioles and sampling at these times should be avoided. Samples should be collected from early to mid morning.

Sampling from the same areas that soil analysis has been conducted and soil water is being monitored is recommended as there is greater likelihood that results can be interpreted in the knowledge of other soil constraints and soil moisture effects. Where a

nutritional problem is suspected, a separate collection of healthy and unhealthy plants may aid diagnosis.

Petiole nitrate-N level declines with time. By flowering, petiole nitrate-N levels are usually declining and it isn't easy to distinguish between crops having sufficient or insufficient N. Beyond flowering leaf tissue tests is a better method of monitoring crop nutrition as it can be used for monitoring all nutrients including micronutrients.



The recently updated NutriLOGIC on the Cotton CRC website

<http://cottassist.cottoncrc.org.au/NutriLOGIC/Default.aspx>

can be used to compare petiole tests with the optimum petiole nitrate status according to the stage of crop development. Crop development is determined by day degrees and the nitrogen fertiliser recommendation is then adjusted according to the region and soil type. Growers need only enter the sowing and sampling dates, and the chemical analyses from their laboratory report.

Leaf sampling

Leaf samples can be used to monitor all nutrients including micronutrients. In fact micronutrients are most accurately assessed with leaf blade samples. Sampling twice (at flowering and boll opening) produces the most useful information although leaves can be sampled at any time. Leaf tissue tests can identify nutrient imbalances, deficiencies and toxicities more precisely than soil testing and assist in optimising fertiliser programs.

NutriLOGIC can also be used for analysing leaf test results. Any action taken based on leaf test results is really dependent on the nutrient in question, how limiting it may be and the stage of crop development.

Late season options for alleviating any deficiencies are limited, particularly for macronutrients. After cut out, crops should be able to fill bolls with the nutrients already taken up. Applying more nutrients may encourage vegetative growth rather than enhance yield. Late season micronutrient deficiencies could be alleviated through foliar applications.