

What is Plant Tissue Analysis?

Plant tissue analysis reveals the health of your crops on a nutrient basis. Used within an integrated nutritional management program it can play a vital part in significantly increasing volume and quality of yield.

Plant Tissue analysis at NRM tests for a wide range of nutrients which includes the total concentrations of the major nutrients N, K, P, Mg, Ca, Na, S, and trace elements B, Cu, Fe, Mn, and Zn.

When reporting the results they are provided as the total nutrient amounts and also as nutrient levels (excessive – deficient) determined for each crop type. This will enable you to assess what is required to bring your crops nutritional status in line with the sufficient level for optimum growth and development.

Plant Tissue Analysis is critical to improving crop nutrition and yield yet it is used far less than soil analysis for nutritional management. Plant tissue analysis and soil testing go hand in hand and one is not a substitute for the other.

It is important to know the nutrient levels in your crops as interactions between all nutrients can affect their growth and development. The addition of one nutrient can influence the amount taken up of another. For example, Zn uptake may be reduced by high P application rates. High K levels may reduce Mg uptake. High rates of NH₄⁺ nitrogen may reduce concentrations of K in the plant.

Plant tissue analysis can help indicate interactions or antagonism among plant nutrients.

What are the Benefits of Plant Tissue Analysis?

Effective use of plant tissue analysis provides the nutrient status at the time of sampling. This may then reveal whether soil nutrient supplies are adequate. From this there can be improved yield and more efficient fertiliser applications. This may lead to both economic and environmental benefits.

In addition to this, effective plant tissue analysis can detect unseen deficiencies (“hidden hunger”) (figure 1) and can be used to confirm diagnosis made from visual symptoms.

Plant Tissue analysis is most commonly used as a diagnostic tool for future correction of nutrient problems. However utilising plant tissue analysis from early growth of crops will allow a corrective fertiliser application that same season before the problems become yield limiting. When visual symptoms have occurred a yield loss has already started (figure 1).

Soil analysis data is often most useful when combined with plant tissue analysis data. The combination of soil and plant tissue analyses (in an integrated nutrient management program) is the most powerful tool in diagnosing plant growth problems.

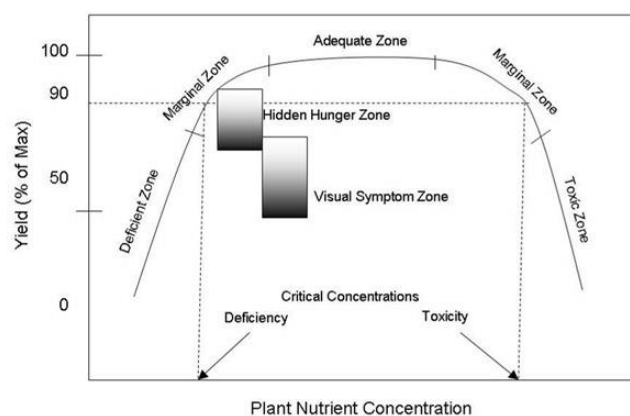


Figure 1: Crop Yield Response curve:

The importance of correct sampling:

Nutrient sufficiency levels have been developed for specific plant parts that are sampled at specific growth stages, so accurate interpretation of tissue analysis depends on proper sampling.

If a suspected nutritional problem occurs at a different stage of growth, collecting samples from both healthy and affected plants, and comparing their nutrient concentrations, is useful to diagnose a possible nutrient deficiency as the source of the problem.

For details of the correct sampling procedure please see NRM's plant tissue sampling guide which can be found on our website www.cawood.co.uk/nrm.

(1) Graph taken from: Lester, D., 2010, Plant tissue testing – an under utilised tool for diagnosing hidden hunger in crops, <https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2010/09/plant-tissue-testing-an-under-utilised-tool-for-diagnosing-hidden-hunger-in-crops>

A review of past data:

NRM has reviewed the analytical data from Plant Tissue analysed at the laboratory for a number of plant species in the last 10 years and a select summary of the data, using the levels of Deficient—Excessive, can be seen here. Although there is a large quantity of crops achieving a sufficient level it can be seen that there are deficiencies occurring for particular nutrients which may be limiting your yield.

