



# Sydney Environmental & Soil Laboratory

Specialists in Soil Chemistry, Agronomy  
and Contamination Assessments

## Plant Analysis

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Plant analysis includes an evaluation of the analytical data to determine whether an element is low, sufficient or high.

### Uses of Plant Analysis:

Plant analysis can be used by turf managers to:

- ✓ Confirm suspected nutrient deficiency symptoms;
- ✓ Verify toxicities;
- ✓ Reveal hidden hunger (i.e. plants show no visible symptoms, but the nutrient content is low enough to reduce growth or affect quality characteristics);
- ✓ Aid in evaluating the efficiency of applied fertilisers;
- ✓ Assist in formulating fertilisation practices; and,
- ✓ Monitor the nutrient status of plants throughout the growing season to determine whether each nutrient is present in sufficient concentration for optimum growth characteristics.

Plant analysis is a proven and effective means of predicting fertiliser needs for many plant species. However, it does not completely replace a soil test. Soil and plant analysis serve different purposes and when properly used they compliment each other in providing detailed information for maximizing the efficiency of fertility programs.

Soil testing is based on the concept that the concentration of a particular nutrient in a given volume of soil reflects whether or not the nutritional level of that soil is adequate for optimum plant growth or production. Plant analysis is based in part on the concept that the amount of a specific nutrient in the plant tissue is related to the plant availability of that element in the soil. Plant analysis also reflects nutrient uptake conditions in the soil. Soil properties such as compaction, root disease, impervious layers and/or poor drainage may inhibit the uptake of nutrients by plants. Or a low concentration of one nutrient in the plant may result from the excessive application of another nutrient. Conversely, favourable soil physical properties and optimum soil moisture may accentuate nutrient uptake even though the soil may not have an abundant supply of nutrients.

As a result of these soil-plant interactions, there are certain instances when contradictions occur between soil and plant analysis results. For example, assume turf is growing on a soil in which the soil tests revealed a medium level of extractable Magnesium. A plant analysis from the area a few weeks later indicates that Magnesium is low. Immediately, the validity of the test results are questioned, which is an absolutely normal response. However, a closer examination of the plant analysis results revealed that the Calcium and Potassium concentrations of the turf were high. Upon checking the information accompanying the plant analysis results, it was noted that Lime ( $\text{CaCO}_3$ ) had been applied at  $500\text{g}/\text{m}^2$  and a high rate of Potassium was applied in the fertiliser program. As a result of these two management practices, the level of Calcium and Potassium in the soil was sufficient to reduce the uptake of Magnesium.

This is one example of how soil testing and plant analysis can be used together for making better nutrient management decisions. Plant analysis can also be used to

supplement a soil testing program. It is particularly useful in distinguishing between Nitrogen and Sulphur deficiencies in turf, as deficiency symptoms of the two elements are similar. Plant analysis offers an excellent means of delineating which element is deficient (which cannot be ascertained through soil testing). If this distinction is not made properly and the wrong corrective treatment is applied, plant growth can be affected appreciably.

In the case of most turf grass species, a soil analysis prior to active growth in spring makes it possible to determine whether lime, dolomite, gypsum and/or specific fertiliser applications will be needed. Plant analysis of the turf during the growing season will indicate if the applied materials were effective and whether the predictions based on the soil analysis were correct.

In order for a plant analysis program to be successful it must include the following essential components:

- ✓ A representative sample of the area in question
- ✓ Proper sample preparation for analysis
- ✓ Accurate analysis of the sample
- ✓ Correct interpretation of the results
- ✓ Proper recommendations based on the analytical data and historical information supplied with the sample



For more information about this topic or other soil, water, plant tissue and environmental questions, please contact Murray Fraser at Sydney Environmental & Soil Laboratory on T: (02) 9980 6554 F: (02) 9484 2427 or E: [murray@sesl.com.au](mailto:murray@sesl.com.au).

**Next article:** Part 2:  
Plant Analysis – What does it all mean? Interpretation and recommendations for improved turf quality.