Agri Resource

Plant Tissue Analysis

Healthy plants contain predictable concentrations of essential elements. Growers who submit plant tissue samples for analysis can monitor actual levels of these elements within a crop throughout the season. They can discover deficiencies or toxicities, even before visible symptoms are present. As a result, they can optimize fertilization in a timely manner, increasing the quality of a crop and its yield.

Plant tissue analysis measures all essential plant nutrients and indicates whether the sample tissue contains an adequate concentration at any given time. Plant tissue analysis alone does not provide enough information to explain why the nutrient levels may be high or low. Together, soil testing and plant tissue analysis form a powerful tool for assessing nutrient problems.

Using Plant Analysis as a Tool to Monitor Nutritional Status

Plant growth and productivity in agricultural growing systems is almost always below its maximum potential. Factors influencing this statement involve genetics, environment and nutrition.

Genetics are controlled thru the use of cultivars, the environment can be managed to a degree by using practices such as: irrigation, fertigation, plasticulture etc.. Nutritional deficiencies/toxicities that are limiting growth can be diagnosed by utilizing plant analysis. Plant analysis (also referred to as leaf analysis) determines the elemental content of a particular plant part for 14 essential plant nutrients.

The approach to using plant analysis can be viewed reactively or proactively. The reactive approach is when a plant analysis is sent to the lab to verify visual deficiency/toxicity symptoms. Unfortunately, when this approach is used it is often too late; plant growth and yield goal are already detrimentally affected. Over the past several years plant analysis for most growers has switched to the proactive philosophy.

The proactive grower will use a sequence of plant analysis to track and log the nutritional status of the plant throughout the growing season. This weekly monitoring of nutritional status allows the farmer to "correct on the grow". The results of the plant analysis findings are used to determine if soil fertility level and applied fertilizers are high enough to meet the crops requirements. This monitoring allows for adjustments and supplements to be added to the fertigation process resulting in stronger plants and increased yields.

When preparing for the growing season, test your soil to determine soil health and fertility prior to planting. If you are applying manure have it analyzed also, with the high cost of fertilizer these two simple tests could put money in your wallet. Finally choose your approach to plant tissue testing, will it be reactive or proactive?

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Elements Reported in a Plant Tissue Analysis

Nitrogen: Involved in the structure of all amino acids, proteins, and many enzymes

Phosphorus: Aids in proper root development and in enhancement of fruit production, seed production, and flower production

Potassium: Involved in maintaining the plant water status, cell tugor pressure, and controlling the opening and closing of stomata

Magnesium: Principle function is in stabilizing the ribosomes for adequate configuration of protein synthesis
Calcium: Acts as a cement between cell walls and is involved in cell elongation in the shoot and growing tips of roots

Sulfur: Associated with the formation of proteins and chlorophyll; essential for the formation of glucoside oils and volatile compounds; promotes legume nodule formation and stimulates seed production

Iron: Aids in the carbon-dioxide assimilation needed for plant function

Copper: Essential for carbohydrate and nitrogen metabolism in plants

*Zinc***:** Enzyme activity is highly dependent on zinc levels in the plant

*Manganese***:** Pollen germination and growth of the pollen tube are highly dependent on manganese

*Boron***:** Directly involved in cell differentiation, maturation, division, and elongation. Also effects the growth of the pollen tube and is related to the rate of germination in a seed

Molybdenum: Aids in the conversion of nitrates (NO_3) into amino acids within the plant; Essential to the symbiotic nitrogen fixing bacteria in legumes and is essential to the conversion of inorganic P into organic forms in the plant

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