TPS Lab

Originators of
Ask The Plant®
DYNAMIC CROP NUTRITION
Your Crop's Dieticians®

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Plant Nutrient Analysis Guide Sheet

Nitrate (N - NO_3 ppm) **Petiole** - In sap for future growth - effect visible in 10 - 14 days. Too much too soon promotes rapid vegetative growth, week cell walls (subjecting the plant to disease and insect pressures) and reduced fruit set.

Nitrogen (N %) **Leaf** – Component of proteins, chlorophyll, nucleic acid.

Phosphate (P - PO_4 ppm) **Petiole** - In sap for future use - reflects present root activity. Can be increased with Humus + PGR's + Microbes.

Phosphorous (P %) **Leaf** – Energy transfer; metabolism, nucleic acid and nucleoproteins.

Potassium (K %) - Affects water uptake & efficiency - sugar production – enzyme forming - health. High requirement for transport of sugars to fruit.

Sodium (Na %) - Low is best, but a trace is essential for internal cell communication.

Calcium (Ca %) - Cell walls - nitrate utilization - roots - leaves - fruit set for pollination and development.

Magnesium (Mg %) - Chlorophyll - photosynthesis - P metabolism - respiration.

Sulfur (S %) – Constituent of proteins; involved with respiration and nodule formation.

Zinc (Zn ppm) - Plant growth stimulator - enzymes - metabolic reaction – transformation and regulation of carbohydrates. Alkaline soils are often deficient.

Iron (Fe ppm) – Chlorophyll formation. In animals: Respiration - oxygen carrier – energy generating metabolism in animals. Alkaline soils are often deficient.

Manganese (Mn ppm) - Enzyme activation - photosynthesis - maturity - P and Ca. Alkaline soils are often deficient.

Copper (Cu ppm) - Chlorophyll formation - catalyzes plant functions – energy; Alkaline soils are often deficient. Essential for animal health – part of enzyme systems of energy production and transport – red blood cell formation.

Boron (B ppm) - Nitrate uptake – calcium uptake and utilization - pollination and sugar transport – control of nutrient uptake. Soils with low CEC or low in Organic Matter and Alkaline soils are often deficient.

Chloride (Cl ppm) – Maturation in small grains and probably other crops; energy reactions.

Molybdenum (Mo ppm) – Enzyme helper, internal translocation and transformation of nitrogen. Acidic soils are often deficient. Especially important to legumes.

Nickel (Ni ppm) – Essential for plant growth and development; very small amounts are needed; Pecans have high demand; key component of certain enzymes, especially those processing nitrogen. Acidic and sandy soils are often deficient.

Silicon (Si ppm) – Essential for physical strength of the plant and transport of other elements. Benefits include cell wall rigidity; prevention of lodging; insect, nematode and disease resistance; drought resistance. Other benefits are being discovered. More benefits to soil. Is not returned to the soil in the water-soluble form at the end of the season with plant breakdown. Must be applied every season.

Cobalt (Co ppm) – Essential for animal health; add to forage production to ensure dietary sufficiency; red blood cell formation.

Selenium (Se ppm) – Essential for animal health; vitamin production; energy production and utilization; add to forage production as required to ensure dietary sufficiency.

Aluminum (Al ppm) – Can be a problem in soils of 6.0 pH or below. Not essential for plants or animals – can be toxic. Interferes with essential metal nutrients such as iron, copper, zinc, and manganese. Soluble in acidic soils. Liming soils counteracts.

SAP (petiole) and leaf TESTING is a quantitative and qualitative analysis of the nutrients in the sap (the plant's blood) flow from the roots to the leaves where photosynthesis occurs to manufacture the complex components known as photosynthates (mainly carbohydrates and sugars).

FOR FUTURE PLANT DEVELOPMENT

A. Foliar applications of nutrients will not immediately show up in the sap as they stay in the leaves to aid plant functions.

Micronutrients do not translocate like N-P-K which can transfer from old to new leaves when sap supply is deficient. The micronutrients (Zn - Mn - Fe - Cu - B - Mo, etc.) do not move. Calcium and magnesium move very little, if at all.

B. Low micronutrients in the sap show the need for foliar applications and/or soil amendment.

C. New leaves will continue to need micronutrients until sap supply improves.

D. Weekly foliar applications will be needed every 5-10 days - PLANTS FEED EVERY DAY!

• **NITROGEN** - Most Petiole Programs are only NITRATE MONITORING tests with Phosphate (PO_4) and sometimes Potash. They usually do not include micronutrients which are essential uptake regulators of the macronutrients.

• **TOO MUCH NITROGEN** too early inhibits uptake of other nutrients and promotes disease and insects. Even heavy fruiting plants can only utilize about 10-15 lbs/ac of actual N per week. Less than 20% of this N is needed by most plants during the first 6-8 weeks of growth, but more for small grains.

• **PHOSPHATE** (PO_4) - In the sap shows root activity. P is taken up mostly by young root hairs. Slower uptake by old roots shows that senescence, or cut-out, is occurring.
- Roots can be stimulated with humus products, hormones, biological inoculants, etc.
- P availability is helped by chemistry of P, S, Ca and other natural materials
- Sudden reductions in P uptake can be the result of new root growth interruptions caused by too much or too little water and/or lack of P, cultivator blight, compaction, nematodes, disease, etc.

ASK THE PLANT® reveals current problems and includes recommendations for overcoming those problems by feeding only WHEN and WHAT is needed in small increments where possible to soil or leaves.

TPSL® includes Secondary (Ca-Mg-Na-S) and Micronutrients.
%N and P in leaves are accumulated totals to date and do not reveal current nutrient needs.