



SAMPLING GUIDE FOR PLANT TISSUE ANALYSIS

Plant Tissue Analysis

The Increasing Need

Modern agriculture demands top yields and quality yields. Additionally, you demand profitable yields. In satisfying these demands, plant tissue analysis has become a valuable crop production tool.

Top quality and profitable yields, unfortunately, don't just happen. Many factors need to be considered ... like adequate moisture and fertility, proper plant population, adapted variety, disease and insect resistance and control ... the list goes on.

One of the more important factors affecting crop yields is the nutrient status of the plant... or the flow of nutrients to plant tissues during the growing season. Nutrient status is an "unseen" factor in plant growth, except when deficiencies become so acute that visual deficiency symptoms appear on the plant.

Plant populations can be counted, and a variety of names or numbers can be read on the label. Rainfall can be measured with gauges. However, the determination of the nutrient status of plants requires precision laboratory analysis of a plant tissue sample during the growing season.

How Can a Tissue Analysis Help?

A plant tissue analysis will show the nutrient status of the plants during the growing season and detect unseen, hidden hunger. Plant tissue analysis can also supply information to confirm visual deficiency symptoms.

Though usually used as a diagnostic tool for future correction of nutrient problems, a plant tissue analysis from young plants will allow for a corrective fertilizer application that same season. Combined with data from a soil analysis, tissue analysis is an important tool in determining proper fertilizer applications to balance the nutrient availability in the soil and the nutrient requirements of the crop.

A complete plant tissue analysis will identify the nutrient status of the following elements:

Tissue Sample Mailing Kits are Available

Nitrogen	Sodium
Phosphorus	Iron
Potassium	Manganese
Magnesium	Boron
Calcium	Copper
Sulfur	Zinc

Collection and Preparation of the Sample

When gathering the tissue sample in the field, be sure to use a clean container. A plastic pail or a paper bag work best. Never use a metal container to gather the sample as the metal may contaminate the sample. To ensure proper sample amount on young plants, collect approximately one pint of lightly packed material. If the plant samples have soil, fertilizer, dust or spray residues on them, they will need to be cleaned. A dry brush works well. For stubborn residues, wipe the samples with a damp cloth or wash the samples with distilled or deionized water'. However, do not prolong the washing. Air-dry the samples. Clean paper bags or envelopes work best to avoid contamination when mailing the samples to the laboratory. Never place fresh samples in a plastic bag/ Do not include roots with samples submitted for nutrient analysis.

Midwest Laboratories will provide sample bags suitable for plant tissue samples and plant sample submittal forms. These forms should be filled out accurately and completely. If complete information is submitted with the sample, the interpretation of the plant tissue analysis will be more meaningful. Ship the sample directly to Midwest Laboratories, Inc. 13611 B Street. Omaha, NE 68144

TISSUE SAMPLING TECHNIQUES FOR SPECIFIC PLANTS

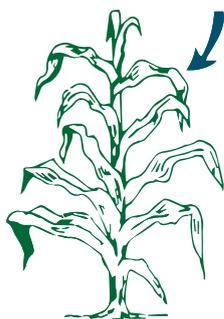
CROP	WHEN TO SAMPLE	PART OF PLANT TO SAMPLE	NUMBER OF PLANTS TO SAMPLE
FIELD CROPS			
Alfalfa	At 1/10 bloom stage or before	Mature leaf blades about 1/3 of the way down the plant	45-55
Canola	prior to seed set	Fully developed leaves from top of plant	60-70
Cereal Grains (including rice)	Seeding stage or prior to heading	All the above-ground portion Four uppermost blades from top of plant	50-75 30-40
Clover	prior to bloom	Mature leaf blades about 1/3 of the way down the plant	50-60
Corn	Seeding stage or prior to tasseling or from tasseling to silking	All the above-ground portion The first fully developed leaves from the top The leaves below and opposite the ear	25-30 15-20 15-20
Cotton	Prior to or at first bloom or when first squares appear	The youngest fully mature leaves on the main stem	30-35
Flax	Seeding stage or prior to heading	Above ground portion or youngest, mature leaves	50-60
Hay, Forage, or Pasture Grasses	Before seed head emergence or at the stage for best quality	The four uppermost leaf blades	50-60
Milo-Sorghum	Before or at heading	Second leaf from top of plant	20-25
Peanuts	Before or at bloom stage	Fully developed leaves from the top of the plant	45-50
Soybeans	Seeding stage or Prior to or during initial flowering	All the above-ground portion The first fully developed leaves from the top	20-30 20-30
Sugar Beets	Mid-season	Fully mature leaves midway between the younger center leaves and the oldest leaf whorl on the outside	30-35
Sugar Cane	Up to 4 months old	Fourth fully developed leaf from the top	25-30
Sunflowers	Prior to Heading	Mature leaves from top of plant	25-30
Tobacco	Before bloom	Top fully developed leaf	8-12
ORNAMENTALS AND FLOWERS			
Carnations	Unpinched plants	4th or 5th leaf pair from base of plant	20-30
Chrysanthemums	Pinched plants	5th or 6th leaf pair from top of primary laterals	20-30
Ornamental	Before or during early flowering	Top leaves on flowering stem	20-30
Trees and Shrubs	Current year's growth	Fully mature leaves	30-75
Poinsettias	Before or during early flowering	Most recently mature fully expanded leaf	15-20
Roses	During flowering	Upper leaves on the flowering stem	25-30
Turf	During growing season	Leaf blades; avoid soil contamination	2 cups of material

**Sample size should be equal to two cups of material.*

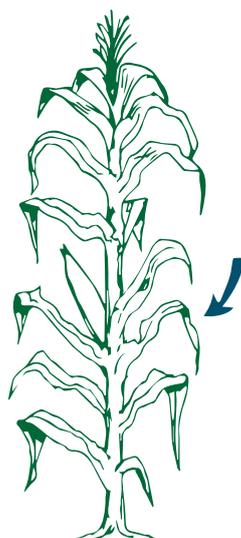
TISSUE SAMPLING TECHNIQUES FOR SPECIFIC PLANTS

CROP	WHEN TO SAMPLE	PART OF PLANT TO SAMPLE	NUMBER OF PLANTS TO SAMPLE
VEGETABLE CROPS			
Beans	Seeding stage or Prior to or during initial flowering	Entire above ground portion Two or three mature leaves at the top of the plant	25-30 25-30
Cabbage, etc. (Head Crops)	Before heading	First mature leaves from center of whorl	10-20
Celery	Mid-growth cycle	Petiole of youngest mature leaf	20-30
Cucumber	Before fruit set	Mature leaves near the base of the main stem	20-25
Leaf Crop (Lettuce, Spinach, etc.)	Mid-growth	Youngest mature leaf	30-50
Melons	Prior to fruit set	Mature leaves near base of main stem	20-30
Peas	Before or during initial flowering	Leaves from the third node down from the top of the plant	30-50
Potato	Before or during early bloom	Third to sixth leaf from growing tip	20-30
Root Crops (Carrots, Beets, Onions, etc.)	Before root or bulb enlargement	Center mature leaves	25-35
Sweet Corn	Before tasseling or at tasseling	The entire fully mature leaf below the whorl The entire leaf at the ear node	20-25 20-25
Tomato (field)	Before or during early bloom stage	Third or fourth leaf from growing tip	20-25
Tomato (greenhouse)	Before or during fruit set	Young plants: leaves from 2nd and 3rd clusters Older plants: leaves from 4th to 6th clusters	20-25
FRUIT AND NUT CROPS			
Apple, Apricot, Almond, Cherry, Peach, Pear, Plum	Mid-season	Leaves near base of current year's growth	75-100
Blueberries	Mid-season or 2-4 weeks before harvest	Youngest fully expanded mature leaves	75-100
Grapes	End of bloom period	Petioles from leaves adjacent to fruit clusters	75-100
Lemon, Lime	Mid-season	Mature leaves from last flush of growth on non-fruiting terminals	30-40
Orange	Mid-season	Spring cycle leaves, 4 to 7 months old from non-fruiting terminals	25-30
Pecan	6-8 weeks after bloom	Leaves from terminal shoot, taking the pairs from the middle of the leaf	30-45
Raspberry	Mid-season	Take youngest mature leaves on laterals of primocanes	25-40
Strawberry	Mid-season	Youngest fully expanded mature leaves	50-70
Walnut	6-8 weeks after bloom	Middle leaflet pairs from mature shoots	30-40

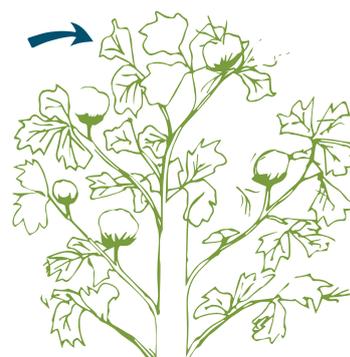
DESIRED SAMPLE LOCATION FROM COMMON CROPS



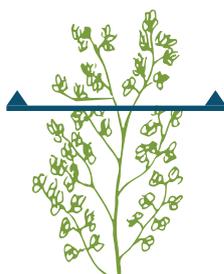
CORN - BEFORE TASSELING
Collect the first fully developed leaves from the top of 15 to 20 plants. (If the plant is less than 12 inches tall, collect all of the above ground portions).



CORN - FROM TASSELING TO SILKING
Collect the leaves below and opposite from the ear of 15 to 20 plants.



COTTON
Collect the youngest fully mature leaves on the main stem from 30 to 35 plants selected at random prior to or at first bloom.



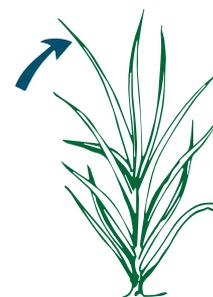
ALFALFA
Collect mature leaf blades and petioles about one-third of the way down the stem at one-tenth bloom stage or before.



SOYBEANS
Collect the youngest mature trifoliate leaves from the top of 20 to 25 plants prior to or during flowering. (In the seedling stage, collect all of the above ground portions).



SORGHUM
Collect the second leaf from the top of 15 to 20 plants before or at heading.



WHEAT, OATS, & GRASS
Collect the four uppermost leaf blades from the top of 30 to 35 plants. (In the seedling stage, collect all of the above ground portions). Sample should equal two cups.



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