A&L REFERENCE GUIDE

SAMPLING GUIDE FOR PLANT TISSUE ANALYSIS

A & L LABORATORIES

The Soil Experts.

Plant Tissue Analysis

Introduction

One of the more important factors affecting crop quality and yield 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 imbalances become so severe that visual symptoms appear on the plant. Determination of plant nutrient status requires precise laboratory analysis of plant tissue during the growing season.

How Can a Tissue Analysis Help?

A plant tissue analysis will detect unseen hidden hunger and confirm visual deficiency symptoms. Toxic levels may also be detected. Though usually used as a diagnostic tool for future correction of nutrient problems, a plant tissue analysis from young plants will allow a corrective fertilizer application that same season. Combined with data from a soil analysis, a tissue analysis is an important tool in determining nutrient requirements of a crop.

A complete plant tissue analysis from **A & L Laboratories** will identify the nutrient status of the following elements:

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

Chlorine, molybdenum and other elements may be useful additions.

Collection and Preparation of the Sample

Be sure to use a clean container. Never use a metal container as the metal may contaminate the sample.

Generally, two cups of lightly packed material provides a sufficient amount to conduct an analysis; one cup may be sufficient if gathering petioles. If plant samples have soil, dust, fertilizer, or spray residues on them, they will need a light washing, as follows: With aid of a plastic colander, immerse the sample in cool water containing a couple of drops of PHOSPHATE-FREE detergent, and gently agitate for no longer than about 10 seconds. Extended washing may damage the plant tissue and remove some of the soluble elements.

Remove the colander and quickly rinse the sample under flowing pure water. Blot-dry with a clean towel. Either air-dry samples for one day (below 176° degrees F) or ship as soon as possible in perforated bags to allow air movement and a degree of drying in transit. ***Never send fresh samples in sealed plastic bags unless kept cool. Never freeze samples. Do not include roots with samples for nutrient analysis unless required.*** Specific sampling procedures are required for disease diagnosis. Therefore, please phone for instructions before sampling.

Sampling Locations: When and Where to Sample

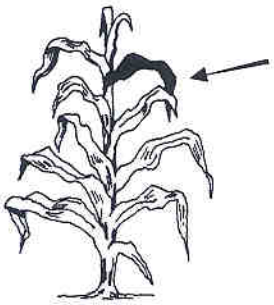
Before taking tissue samples, ensure that timing and location of samples correlates with interpretive data. Instructions for petiole and leaf sampling may differ. Also, comparing samples from both a "good" and a "bad" area often helps in determining corrective action. If specific sampling guidelines are not given, collect recently mature leaves just below the growing point from at least 10 plants. A partial sampling guide follows, ***although many variations exist***. Refer to the A & L Agronomy Handbook for further information.

Free Tissue Sample Mailing Supplies

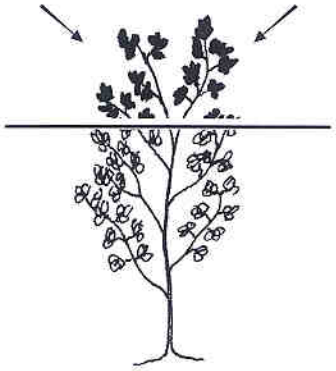
A & L Laboratories will provide suitable plant tissue sample bags, as well as plant tissue submittal forms at no charge on request.

The information you receive on our reports is as accurate as the information submitted with your sample. Please fill out all submittal forms as accurately, completely and legibly as possible.

Desired Sample Location From Common Crops

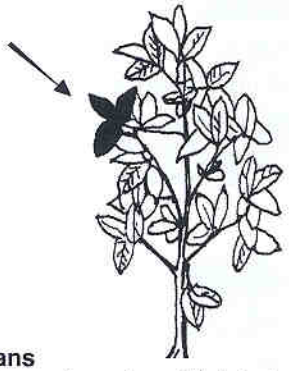


Corn...before tasseling
Collect the first fully developed leaves from the top of 15 to 20 plants. (If the plant is less than 12 inches tall, collect all of the above ground portion).

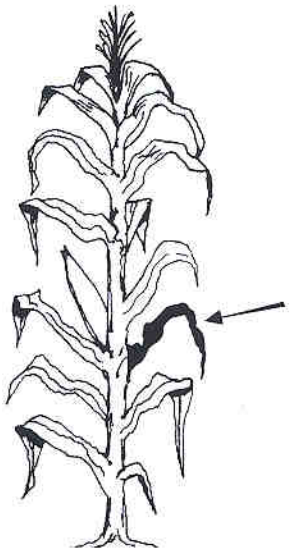


Alfalfa
Collect top 6 inches or upper third of the plant at tenth bloom stage or before.

Pecans, Figs, Olives, Peaches, Nectarines
Collect the mid-shoot leaflets/leaves at mid season.

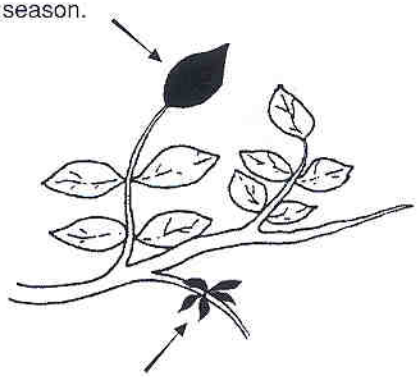


Soybeans
Collect recently mature trifoliate leaves from the top of 20 to 30 plants prior to or during flowering. (In the seedling stage, collect all of the above-ground portion).

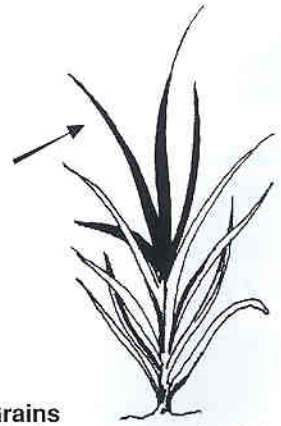


Corn...from tasseling to silking
Collect the leaves below and opposite from the ear of 15 to 20 plants.

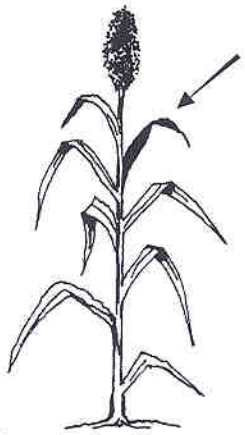
Pistachios, Walnuts, Citrus
Collect terminal leaflets/leaves at mid to late season.



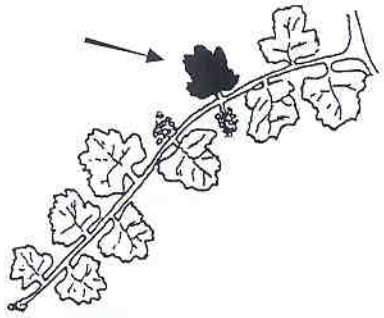
Apples, Pears, Almonds, Apricots, Cherries Prunes, Plums
Collect the leaves from non-fruiting, non-expanding, spurs at mid season.



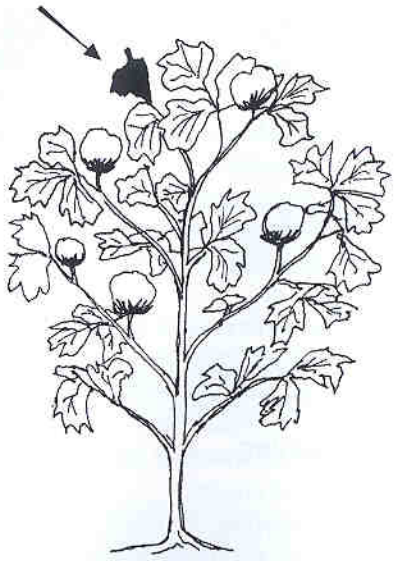
Small Grains
Collect the four uppermost leaf blades from the top of 25 to 40 plants. (In the seedling stage, collect all of the above-ground portion). Sample should equal two cups.



Sorghum
Collect the second leaf from the top of 20-30 plants before or at heading.



Grapes
Collect the leaves opposite basal cluster at bloom.



Cotton
Collect recently mature leaves from the main stem on 40 to 50 plants selected at random at full bloom.

TISSUE SAMPLING TECHNIQUES FOR SPECIFIC PLANTS

Crop	When to sample	Where to sample	Plants to sample*
FIELD CROPS			
Alfalfa	Early bloom stage	Upper 1/3 of plant	12-30
Canola	Before seed set	Recently mature leaf	60-70
Clover	Before bloom	Upper 1/3 of plant	30-40
Corn/sweetcorn	Seedling stage	All above-ground portion	15-20
	or		
	Before tasseling	Recently mature leaf	12-20
	or		
	Tasseling to silking	Leaf opposite/below ear	12-20
Cotton	Full bloom	Recently mature leaf	40-50
Flax	Seedling stage	All above-ground portion	50-60
	or		
	Before heading	Recently mature leaf	50-60
Grasses/ forage mixes	Stage of best quality	Upper 4 leaves	30-40
Peanuts	Before/at bloom	Recently mature leaf	40-50
Small Grains (barley, oats,	Seedling stage	All above-ground portion	25-40
wheat, rye, rice)	Before heading	Upper 4 leaves	25-40
Sorghum (milo)	Before/at heading	2nd leaf from top	20-30
Soybeans	Before/at bloom	Recently mature leaf	20-30
Sugarbeets	Midseason	Recently mature leaf at center of whorl	25-30
Sugarcane	Up to 4 months old	4th fully developed leaf from top	15-20
Sunflowers	Before heading	Recently mature leaf	20-30
Tobacco	Before bloom	Recently mature leaf	10-15
ORNAMENTALS AND FLOWERS			
Carnations	Newly planted	4th-5th leaf pair from base	20-30
	Established	5th-6th leaf pair from base	20-30
Chrysanthemums	Before/at bloom	Top leaves on flowering stem	20-30
Ornamental trees and shrubs	Current year's growth	Recently mature leaf	30-70
Poinsettias	Before/at bloom	Recently mature leaf	15-20
Roses	At bloom	Recently mature compound leaf on flowering stem	25-30
Turf	Active growth	Leaf blades. Avoid soil contamination	2 cups
VEGETABLE CROPS			
Asparagus	Maturity	Fern from 18-30 inches up	10-30
Beans	Seedling stage	All above-ground portion	20-30
	or		
	Before/at bloom	Recently mature leaf	20-30
Broccoli	Before heading	Recently mature leaf	12-20

* SUBMITTED SAMPLE SHOULD EQUAL TWO CUPS OF MATERIAL, THEREFORE REDUCE COMPOSITE SAMPLE ACCORDINGLY.

Crop	When to sample	Where to sample	Plants to sample*
Brussels Sprouts	Midseason	Recently mature leaf	12-20
Celery	Midseason	Outer petiole of recently mature leaf	12-20
Cucumbers	Before fruit set	Recently mature leaf	12-20
Head Crops (Cabbage, cauliflower)	Before heading	Recently mature leaf at center of whorl	12-20
Leaf crops (Lettuce, spinach, etc.)	Midseason	Recently mature leaf	12-20
Melons	Before fruit set	Recently mature leaf	12-20
Peas	Before/at bloom	Leaves from 3rd node from top	40-60
Peppers	Midseason	Recently mature leaf	25-50
Potatoes	Before/at bloom	3rd-6th leaf from growing tip	25-30
Root/bulb crops (carrots, beets, onions, etc.)	Midseason before root or bulb enlargement	Recently mature leaf	20-30
Tomatoes (field)	Mid-bloom	3rd-4th leaf from growing tip	15-20
Tomatoes (trellis or indeterminate)	Mid-bloom from 1st to 6th cluster stage	Leaf below or opposite top cluster	12-20
FRUIT AND NUT CROPS			
Apples, pears, almonds, apricots, cherries, prunes, plums	Midseason (June-July)	Leaves from current season's non-fruiting, non-expanding spurs	50-100
Figs, olives, peaches, nectarines	Midseason (June-July)	Basal to mid-shoot leaves from current season's non-fruiting shoots	25-100
Blueberries	2-4 weeks before harvest	Mid-shoot leaves from current season's shoots	50-100
Citrus	Late season (September-October)	Terminal leaves from current season's non-fruiting shoots	25-40
Grapes	Mid-bloom	Recently mature petioles or leaves adjacent to basal clusters	50-100
Kiwi fruit	Midseason	1st-3rd leaf beyond fruit or mid-cane leaves if non-bearing	50-60
Pecans	Midseason	Paired mid-shoot leaflets from non-fruiting shoots	25-60
Pistachios	Late season (August)	Terminal leaflets from non-fruiting shoots	25-60
Raspberries	Midseason	Recently mature leaves from laterals of primo canes	30-50
Strawberries	Midseason	Recently mature leaves	25-40
Walnuts	Midseason (June-July)	Terminal leaflets from non-fruiting shoots	25-40

*GENERALLY, SUBMIT ONLY PETIOLES IF NO_3- N, PO_4-P, K AND SO_4- S IS REQUIRED.