

Determining the Need to Fertilize Alfalfa

Just before the first cutting of alfalfa is the best time to tissue sample alfalfa. These tests are a more precise measure of plant nutrient levels than soil samples, especially for sulfur, boron and molybdenum. All three of these micro nutrients can be found to be in the deficient range in the Sacramento Valley. Tissue tests are also an excellent measure for the macro nutrients phosphorus and potassium. Phosphorus deficiency is a common reason for poor alfalfa growth because of alfalfa's high utilization rate of this nutrient coupled with marginal soil P levels.

The optimum stage of alfalfa growth to sample is at the 1/10th bloom stage or when regrowth measures ¼ to ½ inch in length. However, if sampled prior to the 1/10th bloom stage (bud stage), then nutrient levels will be approximately 10 percent higher. Table 1 shows the different response levels for nutrients at the 1/10th bloom stage. Increase these levels by 10 percent for the earlier cutting.

Figure 1 illustrates the proper plant part to test for each nutrient along with the collection procedure. Nutrient levels vary in different parts of the plant along with the stage of maturity at sampling. University research has developed the tissue test ranges based on the following:

- Top third of the sample (leaves and stems) for boron, molybdenum and copper
- Middle third leaves for sulfur (SO₄-S)
- Middle third stems for phosphorus (PO₄-P) and potassium

I am available to discuss your tissue or soil test lab results to determine a fertilizer program for your alfalfa. Just call my Colusa office (530-458-0575) to set up an appointment.

Jerry Schmierer

Farm Advisor covering alfalfa in the upper Sacramento Valley

Do I Need Fertilizer? – Ask the Plant!

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Figure 1. Plant tissue sampling and testing: (A) Collect 40 to 60 stems including leaves from at least 30 plants. (B) Cut stems into three sections of equal length. (C) Discard the bottom third. Place the top third in one paper bag and the middle third in another. Dry the samples. Separate leaves from stems in middle third by rubbing between hands. Put leaves in one bag and stems in another bag. Analyze top-third sample for boron, molybdenum, and copper. Analyze leaves from the middle third for sulfur (SO₄-S) and stems from middle third for phosphorus (PO₄-P) and potassium.

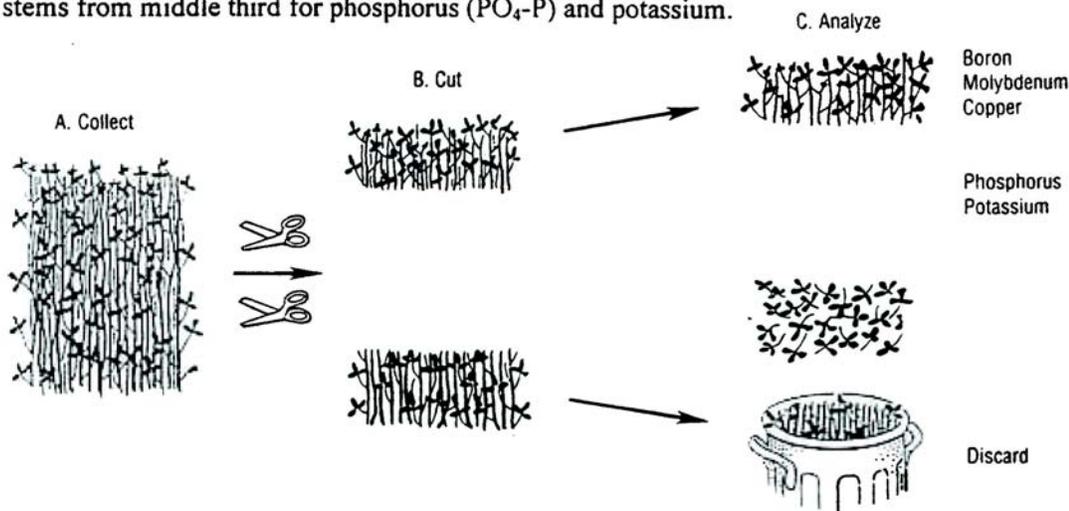


Table 1. Interpretation of test results for alfalfa plant tissue samples taken at 1/10 bloom.¹

Response Category ²	Midstems		Midstem leaves	Top 1/3 of plant	
	Phosphorus (PO ₄ -P) (ppm)	Potassium (Total K) (%)	Sulfur (SO ₄ -S) (ppm)	Boron (B) (ppm)	Molybdenum (Mo) (ppm)
Deficient	<500	<0.65	<400	<15	
Critical	500 – 800	0.65 – 0.80	400 - 800	15 – 20	0.3-0.9
Adequate	800 – 1500	0.80 – .50	800 – 1200	20 – 40	
High	>1500	>1.50	>1200	>200 ³	5 - 10 ⁴

1. Concentrations should be higher if alfalfa is cut at bud stage (multiply tabular values by 1.10)
2. An economic yield response to fertilizer application is very likely for values below the deficient level, somewhat likely for values in the critical level, and unlikely for values over the adequate level.
3. A concentration over 200 may cause reduced growth and vigor.
4. A concentration over 10 may cause molybdenosis in ruminant animals.

Tissue tests can determine only the single most limiting nutrient affecting plant growth—the concentration of other nutrients may actually increase due to reduced growth. Therefore, correct the most severe deficiency with a fertilizer application first. After it is corrected, take new plant tissue samples to determine if other nutrients are deficient. Also, low concentrations of a nutrient in plants may not always indicate a deficiency in the soil. Remember that plant analysis reflects nutrient uptake by the plant: a problem affecting roots, such as nematodes, can affect nutrient uptake as well.

UC Davis Small Grains and Alfalfa Field Day

Wednesday, May 7, 2003 —8:30a.m.-4:00p.m.

UC Davis Agronomy Field Headquarters, Davis, CA

PCA/CCA Credits Offered

This Field Day is designed primarily for grain and alfalfa growers, PCAs, seed companies, and handlers of certified seed. Campus-based faculty and students, and farm advisors, growers, and others interested in small grain and alfalfa production and research, also are invited. Registration (no fee) begins at 8:30 a.m. This Field Day, sponsored the California Crop Improvement Association (CCIA) and the Department of Agronomy and Range Science, UC Davis, will be held at the UC Davis Agronomy Field Headquarters. The Small Grains portion will highlight progress in field research and efforts to improve small grain production in California. The disease wheat stripe rust will receive special emphasis. Following the field tour, a barbecue lunch will be hosted by the CCIA. The Alfalfa/Forage Field Day will follow the BBQ lunch, and emphasize varieties and pest management options, including alternative forage crops such as ryegrass and perennial grasses.

Schedule & Topics:

8:30 Registration-Remarks

Welcome
Foundation Seed and Certification Services
California Wheat Commission

9:00-Noon Small Grains Field Day

FGIS Demonstration
Wheat Breeding and Genetics
Barley Breeding and Genetics
Oat Breeding and Genetics
Regional Wheat, Durum, Barley, Triticale and Oat Germplasm Evaluation
Stripe Rust Screening: Wheat and Barley
Evaluation of Seed Treatment Fungicides

Noon—Barbeque Lunch (Sponsored by California Crop Improvement Association)

1-4-Alfalfa & Forage Field Day (topics)

Hay Sampling Certification/CA Alfalfa & Forage Association News
Stem Nematode and Resistance of Varieties
New Trends in Weed Control Options for Alfalfa
Alfalfa Weevil Control Studies
Alfalfa Varieties, Cutting Schedules, and Traffic Patterns
Alternative Perennial Grasses and Ryegrass
Preventing Offsite Pesticide Movement in Alfalfa
Poisonous Weeds
Vertebrate Pests

Directions: Take 113 from Woodland S. or I80 North, exit Highway 113 at Hutchison Drive in Davis and travel west on Hutchison Drive for about ½ mile. The UC Davis Agronomy Field Headquarters is on the south side of Hutchison Drive next to the Foundation Seed Warehouse.

For more information: contact Lee Jackson, (530) 752-0701, lfjackson@ucdavis.edu or Dan Putnam, (530-752-8982) dhputnam@ucdavis.edu both of the Department of Agronomy & Range Science, University of California, Davis, CA 95616.