

The following estimated fertilizer recommendations for irrigated alfalfa seed are based on the nutrient requirements for alfalfa forage but modified based on important differences in alfalfa seed cultural practices. Considerable research conducted by land-grant universities in the western states and the USDA-ARS has established relationships between alfalfa forage crop yield and nutrient application rates at different soil test values. Considerably less research has been done on the nutrient requirements of alfalfa produced for seed. Differences in the production practices used for irrigated alfalfa seed and forage production have significant implications for satisfying the crop's nutrient requirements.

Biomass Production and Removal—Forage alfalfa vegetative biomass is removed three to four times a season in southwestern Idaho. In contrast, less than 15 percent of the mature plant biomass is removed in a single seed harvest. Consequently, irrigated alfalfa seed production involves much less nutrient removal than harvest of forage alfalfa.

All non-seed biomass is returned to the soil after the harvest of alfalfa seed. In some cases, a portion of the non-seed residue is burned. Early season biomass is less critical for seed production. Biomass is pre-bloom unrec s

cators, or fertilizer dealers/consultants. The publication, *Monitoring Soil Nutrients Using a Management*

Potassium

Alfalfa seed has a low to moderate K requirement. Most Idaho soils and surface irrigation waters are naturally high in K. However, K deficiencies can develop in intensively cropped fields not fertilized with K for extended periods. Sandy soils are generally more prone to developing K deficiencies than silt loam or clay soils and, therefore, have a higher probability of responding to K fertilization. Very little K is removed from fields with the harvested alfalfa seed.

Potassium movement in soils is limited, although not to the same degree as P. As with P, K fertilizer recommendations are also based on calibrated relationships between soil test concentrations at the 0 to

pounds per acre of the required nutrient using soluble forms of Zn, Mn, Cu, or Fe. Molybdenum (Mo) availability is generally adequate in the alkaline soils that are prevalent in irrigated southern Idaho.

Tissue Testing

Plant tissue testing provides an effective means of evaluating the nutrient status of an established forage alfalfa stand, particularly where soil testing results are poorly correlated with yield as with boron. Samples should be collected from about 20 to 30 plants at early bloom in representative areas of the field. The top 6 inches of the stem should be sampled and sent to a testing lab for analysis.

Sufficiency levels for the various nutrients are presented in Table 4. Nutrient concentrations below these ranges suggest a need for supplemental fertilization. Concentrations of K above 4 percent may indicate excessive available K. The Table 4 sufficiency values were established for forage production so caution should be used when interpreting them for alfalfa seed production.

Table 4. Sufficiency ranges for nutrients in the top 6 inches of forage alfalfa stem tissue sampled at early bloom.

Nutrient	Sufficiency range
	(%)
Nitrogen	3.0 to 5.0
Phosphorus	0.25 to 0.75
Potassium	2.50 to 3.80
Calcium	0.50 to 3.00
Magnesium	0.30 to 1.00
Sulfur	0.25 to 0.50
	(ppm)
Boron	20 to 80
Zinc	20 to 70
Manganese	30 to 100
Copper	5 to 25
Iron	30 to 150
Molybdenum	1 to 5

When nutrient deficiencies are identified during the growing season, the deficiencies often can be corrected by injecting water-soluble fertilizers through the sprinkler system. Liquid forms of N, P, K, S, and micronutrients are commonly available in Idaho and should be selected on the basis of cost relative to dry fertilizers and ease of application. If alfalfa seed is furrow irrigated, foliar sprays can be used to correct micronutrient deficiencies, but foliar applications of N, P, K, and S at high rates can cause leaf burning.

About the Authors

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For Further Reading

You may order this or other publications about fertilizers and crops in southern Idaho from University of Idaho Extension offices in your county or Ag Publications, P.O. Box 442240, University of Idaho, Moscow, ID 83844-2240, phone 208/885-7982, fax 208/885-7982, email: agpub@uidaho.edu or Web site: <http://info.ag.uidaho.edu>

- CIS 838 *Inoculation of Legumes in Idaho* (35 cents)
- PNW 570 *Monitoring Soil Nutrients Using a Management Unit Approach*
- CIS 1102 *Southern Idaho Fertilizer Guide: Irrigated Alfalfa* (50 cents)
- CIS 392 *Southern Idaho Fertilizer Guide: Irrigated Pastures, Southern Idaho* (25 cents)
- CIS 828 *Southern Idaho Fertilizer Guide: Irrigated Spring Wheat* (\$2.00)
- CIS 1082 *Southern Idaho Fertilizer Guide: Irrigated Winter Barley* (\$1.50)
- CIS 373 *Southern Idaho Fertilizer Guide: Irrigated Winter Wheat* (\$2.00)
- CIS 1081 *Southern Idaho Fertilizer Guide: Onions* (\$1.50)



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