

THIS ARTICLE IS ABOUT...

RIGHT
SOURCE

RIGHT
RATE

RIGHT
TIME

RIGHT
PLACE

Highlights

- Alfalfa places the highest demand on soil nutrient reserves of any of the commonly grown crops.
- There are several less obvious benefits to maintaining adequate soil nutrients for alfalfa.
- Soil analysis prior to establishing the stand is the best way to get alfalfa off to a healthy start.

Maintaining High Quality Alfalfa: Don't Ignore the Nutrients

Alfalfa is one of the most important crops grown in North America, with its value ranked behind corn and soybeans. It is most commonly grown for hay, but is also harvested for silage. Maintaining a high quality alfalfa stand results in higher yields and enhanced quality forage. This requires a careful combination of plant nutrition, weed control, pest management, and skill in harvesting.

Alfalfa growers face the challenge of balancing achieving top yields with the price premium for early-harvest high quality hay. Alfalfa leaves regrow rapidly after mowing and the leaves are where the majority of the valuable plant protein is located. The stems continue to develop as the plants mature. The stems are lower in protein and high in fiber and indigestible lignin compared with the leaves.

Alfalfa places the highest demand on soil nutrient reserves of any of the commonly grown crops. Every ton of harvested alfalfa removes the fertilizer equivalent of approximately 12 lb of P₂O₅, 50 lb of K₂O, and 5 lb each of Mg and of S. When multiple alfalfa harvests are accounted for, it is clear that large amounts of nutrients are drained from the soil each year.

In addition to supporting the growth of high yields of hay, there are several less obvious benefits to maintaining adequate supplies of soil nutrients. Quality – Nutrient deficiency hurts more than alfalfa yield. For example, studies have demonstrated that an adequate K supply in the soil improves stand persistence and increases the number of shoots per plant. An adequate K supply also increases the number and the activity of rhizobia bacteria, a prerequisite for a healthy N fixation symbiosis. Leaf drop from the alfalfa plants also is minimized with adequate K, resulting in a better leaf to stem ratio and higher quality animal feed.

Adequate P in the soil has been shown to support higher nodule numbers and nodule health essential for protein production. Plant regrowth and recovery after cutting is more rapid with adequate P, compared with deficient P conditions.

Plant Disease Control – Attention to plant nutrition can also benefit alfalfa profitability in less obvious ways. Careful nutrient management can also bring improved resistance to plant disease. In many cases, K-deficient alfalfa is more susceptible to disease than when adequately fertilized. For example, alfalfa leaf spot is decreased with adequate K. Zinc deficiencies make alfalfa more susceptible to fungal diseases such as rhizoctonia and phytophthora. These two root rot diseases can cause major problems in alfalfa. Proper varietal selection, water management, and attention to plant nutrition all work together to minimize root damage.

A key to maintaining high yields and healthy alfalfa stands includes providing an adequate nutrient supply. Soil analysis prior to establishing the stand is the best way to get young alfalfa off to a healthy start. Tissue testing in subsequent years is a good way to track nutrient trends over time and spot encroaching problems. There are well-established methods for testing alfalfa nutrient concentrations in the plant tissue. A newly developed test from the University of California to sample hay bales also shows considerable promise as an easy and convenient way to track nutrient sufficiency.

Proper plant nutrition is fundamental to successful alfalfa production. Use only those nutrients that are needed to achieve your production goals. Remember that not all yield-robbing deficiencies are visible to the eye. Keep track of your nutrient use and select the right source and rate to protect the investment in your alfalfa stand.



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The information presented here is mostly general and conceptual. For more specific information regarding safe rates of in-furrow fertilization for specific crops and conditions, one should refer to university extension resources, and/or consult a knowledgeable and experienced crop advisor or industry professional. Also, an Excel decision support tool is available online. Visit the IPNI website www.ipni.net/toolbox.

Source Material

Mikkelsen, Dr. Robert,
"Maintaining High Quality Alfalfa:
Don't Ignore the Nutrients," IPNI
Plant Nutrition TODAY, Summer,
2010, No. 3, www.ipni.net/pnt