



# Agronomic Spotlight

## Management Practices for Alfalfa in Summer and Fall

- Understanding alfalfa growth and development can help in applying best management practices to maintain a good stand and maximize yield potential and forage quality.
- A late summer alfalfa cutting should occur early enough so plants can regrow, produce, and store carbohydrates in the roots and crowns before entering fall dormancy, thus increasing winter survivability.
- Accurate stand evaluation is critical for estimating yield potential and deciding whether to keep an alfalfa stand.

### Alfalfa Growth Cycle

Carbohydrates (CHO) produced through photosynthesis are stored in alfalfa roots and crowns to help develop cold hardiness and survive winter temperatures. The stored CHO act as “antifreeze” protecting plants from cold temperatures. Alfalfa’s response to drought is similar to that of cold hardiness.<sup>1</sup> Alfalfa plants can go dormant during extended periods of drought and still recover with adequate moisture. Plants can survive as long as their crowns and roots remain viable with adequate CHO.

During spring, this reserved energy is used to initiate and continue growth after each cutting. The depletion of the reserved CHO will slow down when plants reach 6 to 8 inches in height and are able to produce CHO during photosynthesis. At this stage, more energy is produced and stored in the roots and crowns than used for growth. Storing CHO will continue and reach its highest level at about full bloom.

After the first cutting, when plants are at mid- to late-bud stage and reserves are not at their highest level, the cycle of reserve depletion and storing is repeated for each subsequent cutting.

### Alfalfa Harvest

A late summer alfalfa cutting should be done either early enough so plants can regrow, produce, and store adequate CHO reserves or be cut so late that plants do not regrow and deplete the reserved CHO.<sup>2</sup> This can help plants survive winter temperatures and use the stored CHO to regrow in the spring. Research has shown that a late fall cutting can be done as long as there will be an accumulation of less than 200 GDD’s after the cutting to prevent regrowth and depletion of stored CHO; allowing plants to survive winter conditions.<sup>1</sup>

### Nutrients and Soil pH

Nutrient removal is high because the above-ground portion of alfalfa is normally harvested 3 to 5 times per growing season. Soil testing should be done to accurately estimate nutrient requirements, especially phosphorous (P), potassium (K), and soil pH levels. The recommended soil pH level is between 6.8 and 7.0 and alfalfa responds well to fertilization with P and K

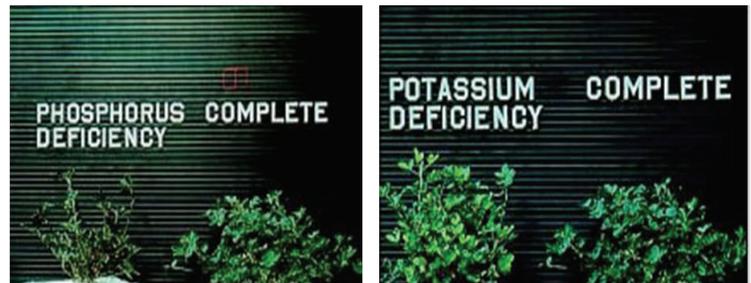


Figure 1. Alfalfa response to phosphorus and potassium.

(Figure 1). Split applications of P and K, based on yield goals, are recommended after the first cutting and again in late summer. A single annual application should be completed in early fall to help minimize the potential for winter injury.



Figure 2. Count stems method.

### Evaluate Established Stand

Alfalfa has the ability to yield well over a range of stand densities. An accurate method to assess established alfalfa stands and estimate yield potential is to count stems (Figure 2). Fall estimation can predict whether it will be better to keep or rotate out of a stand. Older stands tend to have fewer plants, but more stems per plant. Count the stems within an area (either 17 x 17 inches or a 2 square feet frame) at 4 to 5 locations. Take the average of the counts and divide this number by 2 to determine the average stems per square foot to estimate yield potential of the stand. If the count is more than 55, stem density has 100% yield potential; whereas 40 stems have about a 72% yield potential and replacement should be considered.

### Autotoxicity

Limited seedling establishment can occur when seeding into existing stands or into a field where alfalfa was recently removed. Autotoxicity is a problem in alfalfa stands that are two

# Management Practices for Alfalfa in Summer and Fall

or more years old. However, reseeding into an existing stand is generally successful if the stand is less than one year old and soil pH and fertility in those areas is optimum.

Autotoxic compounds produced by alfalfa can: inhibit plant growth, increase the number of days to germination, reduce root and shoot length, and negatively affect future yield potential. In cases where alfalfa stands are thin, but it is not practical to destroy the stand, consider interseeding grasses or clover to meet forage needs.

## Weed Control

Conventional alfalfa products have limited weed control options, which can hinder stand establishment and persistence resulting in lower yield potential (Figure 3). A Genuity® Roundup Ready® Alfalfa system gives alfalfa producers the advantage of broad-spectrum weed control and application flexibility with Roundup® brand agricultural herbicides reducing crop injury or rotational concerns. Based on the weeds present, one or more herbicides with different sites of action should be used at least once during the middle years of the stand to help prevent weed shifts or resistance.

## Summary

- Providing an adequate supply of nutrients, especially potassium, is important to maintain high yield potential.
- Plants can survive winter temperatures if the last cutting was completed by late summer when adequate root reserves can be replenished or late fall after no regrowth.
- Carbohydrates stored in the roots and crowns provide energy for regrowth after harvest and provide winter hardiness to survive winter temperatures.
- Alfalfa following alfalfa rotations are usually unsuccessful due to autotoxicity. Reseeding thin stands is only somewhat successful during the initial year of establishment and with adequate soil pH, fertility, and minimal disease or pest pressure.
- Grow an alternative crop for a minimum of one year to negate autotoxicity and to give time for the soil to improve pH and fertility.
- Planting a Genuity Roundup Ready Alfalfa product can help increase establishment, forage quality, and yield potential, by offering more weed control options compared to planting conventional alfalfa products.

Weather conditions can influence management decisions throughout the life cycle of an alfalfa crop. Additional information on best management practices for alfalfa can be found in the Alfalfa Management Guide.<sup>3</sup> This guide was developed by extension specialists from several universities to give an overview on production practices and can be found online at:

<https://www.agronomy.org/files/publications/alfalfa-management-guide.pdf>



Figure 3. Regrowth of Genuity® Roundup Ready® Alfalfa (left) compared to conventional alfalfa (right).

### Sources:

- <sup>1</sup> Bamhart, S. 1999. Fall harvest management of alfalfa. Integrated crop management. Iowa State University, <http://www.ipm.iastate.edu>.
- <sup>2</sup> Undersander, D. 2012. Late summer cutting management of alfalfa. University of Wisconsin, <http://http://ipcm.wisc.edu>.
- <sup>3</sup> Undersander, D., Cosgrove, D., Cullen, E., Grau, C., Rice, M.E., Renz, M., Shaeffer, C., Shewmaker, G., and Sulc, M. 2011. Alfalfa Management Guide. <https://www.agronomy.org/files/publications/alfalfa-management-guide.pdf>  
Additional Source: Summers, C. G. and D. H. Putnam. 2008. Irrigated alfalfa management for Mediterranean and desert zones. University of California publication 3512. <http://alfalfa.ucdavis.edu> Web sources verified: 5/4/15

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology, Development, & Agronomy by Monsanto.

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