

# Preplanting Strategies Assure Success

## Establishing Alfalfa: Part 2

Planning ahead is essential to establish a successful alfalfa stand.

Story & photos by Ed Haag

**Editor's Note:** This is the second installment of a three-part series exploring when and how to establish a new stand of alfalfa.

If there is a single piece of advice all experts have regarding alfalfa production, it is to plan ahead. "You want to do any kind of corrections to your soil well ahead of seeding your alfalfa," says Richard Sparks, agronomist and irrigation specialist with the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Center, Colo. "Some of these changes take time."

Sparks works with hay producers in the central mountain region, where alfalfa is commonly grown with grasses and then fed to cattle. He notes that with alfalfa in the mix, the grower is not just faced with making sure the soil has the correct nutritional balance. There is also soil structure and soil pH to consider.

### Beware of hard pan

Dennis Cash, Extension forage specialist with Montana State University, is well aware of the limitations soil structure can have



on alfalfa stand establishment. He points out that alfalfa grows best on deep soils that provide adequate internal drainage. Bedrock and hardpan restrict root development and have a negative effect on both the production of forage and the propagation of the nitrogen-fixing bacteria nodes that are critical to enhancing the usable nitrogen levels in the soil.

Hardpan and bedrock are often responsible for standing water and low oxygen environments, which, in turn, kill alfalfa stands over a period of time.

Poorly drained soil also increases alfalfa's vulnerability to the fungi-caused diseases such as Phytophthora root rot. These pathogens proliferate in stagnant, high-moisture soils.

Cash admits that little can be done about bedrock except to convert those areas over to shallow-rooted crops, but hardpan is definitely correctable. He recommends using deep-tillage ripping equipment to break through the hardpan, thus restoring proper drainage to the soil. In Montana this involves ripping the ground immediately after the previous alfalfa stand is taken out of production and before the rotation crop is planted. Cash explains that if the grower waits for the rotation crop to be harvested, it is likely he will face a hard frost that, in turn, will prevent him from ripping the ground until spring. "We seed our alfalfa in the spring," he says. "It is better to have the ripping done with by then."

### Test pH early

Dan Undersander, Extension forage agronomist with the University of Wisconsin, notes that in many areas of the Midwest, pH can shift from neutral to acidic in a couple of seasons. "This can have a major

impact on the health of an alfalfa stand," he says. "The nitrogen-fixing bacteria attached to the alfalfa roots do not do well if the soil is acidic — under 6.5."

Without the presence of a healthy population of bacteria, it is impossible to maintain a vigorous and productive alfalfa stand without annual applications of a nitrogen fertilizer. "When I walk out into alfalfa fields and see a lack of vigor, a lack of growth and a lack of nodulation, the first thing I ask the farmer is what is the soil pH," Undersander says. "Often as not, that is the problem."

He believes in most cases the most cost-effective solution is to modify the soil pH by applying crushed limestone to the soil one year prior to seeding.

Research conducted by Pennsylvania State University shows that a typical requirement of 2 tons of limestone every three to four years has an annual cost of \$10 per acre per year. When compared with the \$60 per acre per year cost of applying nitrogen, the limestone is a bargain.

Undersander notes that modifying the soil pH with lime one year in advance offers other advantages. Most growers rotate their alfalfa stands with two years of annuals to reduce yield-robbing diseases and to take advantage of the legume credits resident in the soil.

One popular rotation crop for beef producers is silage corn, but Undersander warns that seeding alfalfa directly after corn could affect liming requirements. Triazine herbicides, commonly used in corn production, will bond to acidic soil rather than being absorbed. Higher rates of limestone will have to be used, and there is risk of a residual effect on the newly seeded alfalfa stand the following year. The best way to avoid this and get optimum benefits out of the herbicide is to maintain a soil pH of above 6.2 throughout the crop rotation.

In spite of the obvious benefits, many alfalfa growers are still not using enough lime to control their soil pH, Undersander says. "Here in the state of Wisconsin, we only put



► Each harvested ton of alfalfa removes approximately 11 lb. of P<sub>2</sub>O<sub>5</sub> and 53 lb. of K<sub>2</sub>O.

on about half the recommended amount according to lime sales.”

### Timing applications is critical

For Undersander, poor planning is the primary cause for underliming. “The lime should go on the crop previous to planting alfalfa, so that it has been there at least a year and has had a chance to ameliorate the pH of the soil,” he says. “Some alfalfa producers don’t plan ahead far enough so that the lime will do any good.”

This means that growers should soil-test the fall prior to planting the last rotation annual, then apply lime prior to the annual’s spring seeding.

A comprehensive soil test should include the recommended application of lime and what type and coarseness is needed. One financial advantage of liming well in advance of planting alfalfa is that coarser, lower-priced lime can be used when it has enough time to break down. “A finer grade of lime increases the cost approximately \$5 a ton,” Undersander says, adding that those using a coarser grade of limestone have a residual advantage as well.

“When you apply a finer grade, it raises the soil pH quickly by breaking down right away, but you don’t have the bigger particles left to buffer the soil over a long period of time,” he notes.

He recommends broadcasting lime on the surface, discing it in, then plowing it under for maximum distribution and optimum utilization. Plowing down without discing can concentrate the lime in a layer at the plow sole.

For those soil sample recommendations that require 6 or more tons of lime to the acre, Undersander suggests splitting applications. The grower can — prior to planting the last year of corn — apply, disc and plow down two-thirds of the required lime, then immediately follow the same procedures with the remaining one-third.

Undersander suggests a second liming option for those who plan tillage operations between the corn harvest and seeding the new alfalfa stand. “Put on two-thirds of your lime, disc, plow and plant your corn crop,” he says. “Then apply and disc the rest in the fall with the idea of planting your alfalfa the next spring.”

### Saline or sodic soils

One of the issues in several western beef production areas, including Montana and Utah, is saline or sodic soils. Soil pH values above 8.2 indicate excess sodium (Na). This includes soils with an exchangeable sodium percentage above 15%.

Most alfalfa agronomists agree that the best way to deal with saline soil is to avoid it, but in some circumstances excess salt in the soil

can be removed by applying large amounts of water to the site to flush it below the root zone.

The effectiveness of soil flushing will depend on the composition of the salts. Often, amendments are required to provide a mechanism to displace sodium from the soil. Consult with your local Extension agent to determine whether flushing is feasible in your area.

### Don’t forget the P and K

If there are two limiting nutrients for alfalfa production, they are phosphorus (P) and potassium (K). Each harvested ton of alfalfa removes approximately 11 pounds (lb.) of  $P_2O_5$  and 53 lb. of  $K_2O$ .

Cash recommends soil testing after the last rotation crop has been harvested so appropriate inputs can be applied and properly incorporated prior to seeding.

“In Montana, we usually seed our alfalfa in the spring,” he says. “If it is at all possible, we recommend that nutrients be applied and incorporated the fall before planting.”

This is particularly important with phosphorus, because it is not mobile. Unless it is physically incorporated, it will remain on the surface and away from the root zone, where it is needed to promote rapid root growth, strong seedling development and high yields.

The most common way of introducing potassium to the soil is through the application of potash (KCl). As with the phosphorus, the potash is broadcasted and physically incorporated into the soil prior to planting. Potassium is necessary for healthy, vigorous plants; winter hardiness; and persistent stands.

### Selecting the right seed

Clark Israelsen, Extension agent in Cache County, Utah, works extensively with alfalfa growers in the northern part of his state. He believes the variety selected should be adapted specifically to the area where it is being planted. Most forage-producing states have alfalfa variety trials, which measure the performance of the various alfalfa varieties under local conditions. “Winter survival, fall dormancy and other important traits are ranked on a one-to-five scale,” Israelsen says, adding that local Extension agencies should have the rankings on each variety, along with recommendations for specific locales.

He notes that selecting pest-resistant varieties of alfalfa is also important, especially when other control measures have limited success. “We have been seeing more root/stem nematodes in our area,” Israelsen says. “Planting resistant alfalfa is the best way to deal with that problem.”

For Israelsen, there is no substitute for certified seed. He believes individuals who



► Seeding alfalfa directly after corn silage production could affect liming strategy.

try to save money by purchasing uncertified seed are penny-wise and dollar-foolish. “We had some cases over the last couple of years where folks thought they were planting good, clean seed,” he says. “They ended up with that parasitic weed called dodder.”

When looking for the right grass to grow in combination with alfalfa, Sparks suggests a continuous tillering type that produces throughout the growing season rather than slowing down into the summer. “You want a grass that will keep up with the alfalfa on every cutting,” he says. “Some will give good tonnage the first cutting, and then the next couple cuttings it is just alfalfa.”

Sparks recommends orchard grass and smooth brome grass as two excellent candidates for including in an alfalfa-grass mix. He notes that the orchard grass comes out of dormancy later than many grasses, but its ability to sustain production during the summer and late fall makes it an ideal grass for mixing with a high-production legume such as alfalfa. One of the drawbacks of orchard grass is its susceptibility to winterkill, but recently released varieties have shown a major improvement in that area.

Smooth brome grass is known for its winter hardiness, seedling vigor and rapid stand establishment. Like orchard grass, smooth brome grass offers continuous tillering and consistently delivers excellent yields throughout the season. Because of its ability to spread with subsurface rhizomes, smooth brome grass is particularly well-suited for filling in bare spaces that develop in older stands.

Other grasses that are popular in mixes are meadow brome grass, tall fescue and ryegrass.



