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G83-652 Seeding and Renovating Alfalfa

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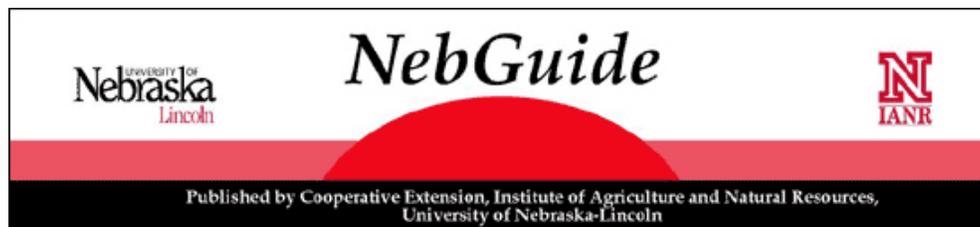


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Seeding and Renovating Alfalfa

This NebGuide discusses alfalfa production, including site selection and preparation, fertilization, variety selection, seeding, companion crops, stand management, weed control and stand renovation.

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- [Renovating Thin Alfalfa Stands](#)

Alfalfa can produce more protein per acre than any other crop in Nebraska. Up to 100 percent of the protein needs of most livestock can be supplied by alfalfa in addition to large amounts of vitamins, minerals, and energy.

Besides being an excellent livestock feed, alfalfa improves the soil by adding nitrogen and organic matter, increasing water infiltration, improving soil structure, and providing excellent erosion control. All these attributes make alfalfa a highly desirable crop for many farms and ranches.

Follow proper seeding techniques when establishing alfalfa stands. Poor seeding management will decrease chances of developing a productive alfalfa stand. High yields of good quality forage can result only from well-established, properly managed, productive stands of alfalfa.

Select a suitable soil.

Alfalfa thrives on deep, well-drained loam, silt loam, or clay loam soils with a pH between 6.2 and 7.5. Sandy soils can produce excellent alfalfa yields when properly fertilized and irrigated. When alfalfa is grown on subirrigated sites, permanently wet soil should be at least 3 feet, and preferably 6 or more feet, below the soil surface. Avoid poorly drained soils or those with high water tables because alfalfa will not survive under permanently wet conditions. Alfalfa is also poorly suited for saline or shallow soils.

Avoid seeding alfalfa into soils that contain residual herbicides from previous crops (see NebGuides *G74-113, A Quick Test for Atrazine Carryover*, and *G82-637, Herbicide Carryover*).

Check fertility of the soil.

Take soil samples to determine nutrient requirements before applying fertilizer. If fields are to be irrigated, also take a water sample since some nutrients may be present in the water. Both samples can be tested for lime and nutrient requirements at the University of Nebraska's Soil Testing Laboratory in Lincoln, or at a reputable commercial laboratory. Contact your local Extension agent for sampling and mailing instructions.

When requesting recommendations, set high but realistic yield goals. Do not try to save money by skimping on fertilizer. High yields of alfalfa will easily offset small fertilizer savings.

Apply lime and fertilizer.

Incorporate lime (when needed) into the soil prior to seeding. If more than 2 tons of lime per acre are required, incorporate lime at least 6 months before seeding.

Most soils in Nebraska need phosphorus to produce top yields of alfalfa. It can be broadcast and incorporated into the soil prior to seeding, or can be band applied with the seed by the drill at planting.

Band application at seeding is often more effective than broadcast because it places readily available phosphorus near the roots of new alfalfa seedlings. Alfalfa production on sandy soils often benefits from other nutrients, especially sulfur. Sulfur is most often needed where soil organic matter is less than 1 percent and irrigation water (if used) is low in sulfur. Boron may improve yields on some sandy soils.

Alfalfa also uses many other mineral elements, such as zinc, copper, iron, and magnesium. However, most Nebraska soils supply adequate amounts of these minerals. No yield increase has ever occurred from adding these minor elements in Nebraska research studies.

Nitrogen fertilizer is generally not beneficial when applied to alfalfa. However, 10 to 15 pounds of nitrogen/acre applied at planting time often improves establishment on sandy soils.

Prepare a firm seedbed.

Alfalfa seeds must have close contact with soil particles and soil moisture to insure rapid emergence. A firm seedbed also helps prevent seed from being planted too deep. Leave just enough loose soil to cover seed after planting. On a properly prepared seedbed, you should sink in about 1/2 inch when walking across the field.

Avoid rough, cloddy seedbeds because proper seeding depth and good seed-to-soil contact is difficult to control. Do not over-prepare seedbeds on fine textured soils as soil crusting may occur after it rains and hinder seedling emergence.

Protect steep slopes from erosion. Plant residue or stubble can be used effectively. Late summer no-till seeding into small grain stubble can be particularly effective. However, annual weeds and volunteer grains must be controlled. Companion crops also reduce the hazard of erosion, but must be removed before they compete excessively with new alfalfa seedlings.

Plant productive varieties.

NebGuide *G77-357, Selecting Alfalfa Varieties for Nebraska*, lists alfalfa varieties that have been tested in Nebraska. Select moderately winter-hardy or hardy varieties for stands that are expected to last for 3 to 4 years. Plant hardy varieties for stands anticipated to last more than 4 years. Since diseases and insects can be problems for alfalfa, select varieties resistant to pests common to your area.

Plant high quality seed of varieties with a high yield potential. Common seed or uncertified varieties are poor choices. A yield increase of only 1/2 ton/acre of hay worth \$50/ton will increase returns by \$25/acre each year. These returns will pay for the higher price of high quality seed.

Inoculate alfalfa seed.

Apply inoculum to the seed before planting (see NebGuide *G79-435, Inoculation of Forage Legumes*). Inoculating with the proper type of bacteria helps alfalfa form root nodules that convert nitrogen from the air into a form that plants can use. Thus, nitrogen fertilizer is not needed.

Some alfalfa seed is sold pre-inoculated. In addition, bacteria are often present in soils that grew alfalfa previously. Inoculation may not be necessary in these instances. However, preinoculants can be damaged during handling and storage, and soil bacteria may not be very numerous or effective. Therefore, add fresh inoculum to seed to help insure adequate nodule formation and nitrogen fixation

Pure alfalfa vs alfalfa-grass mixtures.

Pure stands of alfalfa usually produce the highest protein yield and often the highest tonnage on soils well suited for alfalfa. Grasses are sown with alfalfa for a number of reasons. Grass fills in gaps in alfalfa stands caused by poor alfalfa establishment or winter-killing. Grasses reduce weed invasion and soil erosion. If alfalfa is grazed, bloat is less likely to occur when 2/3 or more of the stand is grass. Alfalfa-grass mixtures cure more rapidly and ensile more easily than pure alfalfa. However, most grass yield is at first cutting, so there is little advantage of grass at later harvests.

Seed at proper rates and dates.

Seeding rates shown in *Table I* assume that proper seeding practices will be followed. Sowing additional seed does not improve a stand when poor seeding management is used.

Table I. Seeding rates for alfalfa hay, alone and in mixtures, on dryland or under irrigation.	
Dryland	lbs PLS/A¹
Alfalfa alone	10
Alfalfa	10
Oats	20
Alfalfa	8
Smooth brome	4
Alfalfa	8
Intermediate wheatgrass	6
Alfalfa	8
Orchardgrass (eastern 1/3 of state)	2
Smooth brome	3
Irrigated	lbs PLS/A¹
Alfalfa alone	12
Alfalfa	12
Oats	20
Alfalfa	8
Orchardgrass	4
Smoothbrome	4
¹ lbs PLS/A = pounds of pure live seed per acre.	

Seed alfalfa between April 1 and May 15 in eastern and southern Nebraska, between April 15 and May 15 in western and northern Nebraska, or in August in all locations. Seeding can be extended to June 1 in spring if irrigation is available. Soil moisture is usually favorable for plant establishment during early spring. However, weeds can be a problem for spring seeding. August seeding avoids most weed problems, but depends on soil moisture, fall rains, and adequate time for the plants to develop strong roots in order to survive the winter.

Use proven seeding methods.

Seed alfalfa 1/4 to 1/2 inch deep in fine textured soils and 3/4 inch deep in sandy soils. Seeds placed too shallow may fail to germinate. Seedlings that develop from seeds placed too shallow will dry out rapidly and die or develop poor roots. Seeds planted more than 1 inch deep may be unable to reach the surface after germinating.

On firm, clean-tilled seedbeds, use a drill equipped with depth bands and packer wheels. This is usually the most

reliable seeding method. Seeding equipment that places seed between two corrugated rollers works well in eastern Nebraska on fine-textured soils that have good moisture retention and are not erosive. Do not use the roller-type seeders on sandy soils because seedlings will dry out due to shallow seed placement.

Another excellent method of seeding involves using specially built or modified drills to seed directly into the stubble of small grain in August without further seedbed preparation. This method is especially well-suited for sandy, erosive soils in central and western Nebraska.

Stubble seeding will not work well if weedy grasses or volunteer grain plants are abundant. Light disking or herbicides can control moderate amounts of weeds. Stubble seeding is also difficult if excessive straw remains. Remove excess straw by baling or chopping.

Manage companion crops carefully.

Small grain crops are sometimes seeded with alfalfa to provide rapid soil stabilization and seedling protection. They should be seeded only when protection is needed. Otherwise, make clear seedings of alfalfa alone.

Do not seed companion crops to obtain a grain crop during establishment. Companion crops compete with alfalfa seedlings for light, moisture, and soil nutrients just like weeds. They should be harvested as forage no later than the boot stage. Waiting to harvest grain from companion crops risks stand loss of alfalfa.

Oats are an excellent companion crop for fall- or spring-seeded alfalfa. Seed only 15 to 20 pounds of oats per acre to prevent the oats from competing seriously with young alfalfa seedlings. Only use oats that are free of weed seed. Do not use wheat, rye, or barley because they are often too competitive for alfalfa seedlings.

Weeds must be controlled.

Start by preparing a weed-free seedbed that will provide alfalfa seedlings with an environment for rapid growth.

Use preplant incorporated herbicides when seeding alfalfa alone in the spring (see NebGuide *G75-220, Weed Control in Alfalfa*). On non-erosive soils, seeding alfalfa alone and using herbicides for weed control will usually develop productive alfalfa stands most rapidly. Do not use these herbicides if a companion crop is used or if an alfalfa-grass mixture is seeded. Preplant incorporated herbicides will injure or kill small grain and grass seedlings.

Most broadleaf weeds that are less than 3 inches tall can be controlled in alfalfa seedings by using 2,4DB. *Do not use 2,4-D.* Alfalfa must have at least 2 to 4 trifoliolate leaves to avoid herbicide injury. Do not feed treated forage to livestock for at least 30 days after spraying.

Sometimes, chemical weed control is undesirable and many weeds may develop. In addition, some weeds may escape chemical weed control. If this happens and they are shading new alfalfa seedings, clip the weeds at a height that allows most of the leaves to remain on the alfalfa seedings, using mowing equipment that will not smother the young seedlings with weed clippings.

Manage new stands carefully.

Do not harvest alfalfa seeded in August until the following spring. Allow spring and August seedings to start to bloom before the first harvest. Thereafter, harvest at 1/10 bloom.

Renovating Thin Alfalfa Stands

Farmers and ranchers often seek ways to thicken existing alfalfa stands to increase production. This practice is often unsuccessful because soil conditions, age of stand, and whether or not the field is irrigated, all influence its effectiveness.

Thickening stands is only useful if production of alfalfa increases. Fertilizer and harvest management must be able

to support additional alfalfa plants. Furthermore, sufficient moisture must be available to obtain higher yields.

Alfalfa requires 6 to 8 inches of moisture to produce 1 ton of forage. Under dryland conditions, young stands produce high yields because they use the current year's precipitation plus stored soil moisture. After 3 to 4 years, yields decrease because most of the stored soil moisture has been used.

Two to three alfalfa plants per square foot will produce maximum yields in older stands on dryland. Stands thicker than this will not produce more forage because lack of moisture limits production. Therefore, it is usually best to rotate to another crop for several years before reseeding alfalfa.

Under irrigation, 4 to 6 plants per square foot are needed for maximum production. Since soil moisture is not necessarily limiting, establishing more plants may increase production when fewer than six plants per square foot are present.

However, seeding alfalfa into established alfalfa stands is often unsuccessful. Insects and seedling diseases are common. In addition, water-soluble compounds from existing alfalfa plants may inhibit germination and growth of new alfalfa. This condition occurs most frequently when alfalfa is tilled before reseeding or when many live alfalfa plants remain in the stand.

Under certain conditions alfalfa can be interseeded into existing alfalfa to thicken stands. A low-till drill that cuts the sod and places seed in contact with mineral soil is needed. This practice is most practical and successful on irrigated sandy soils. Herbicides are needed to reduce competition from the existing alfalfa and other vegetation. Paraquat, at 1 to 2 pints/acre, will usually provide sufficient suppression of alfalfa and associated grass or weed growth on sandy irrigated sites to allow seedlings to become established. Roundup, at 1 to 2 quarts/acre, is usually needed on heavy or fine-textured soils as well as on some sandy sites to adequately reduce competition. Either herbicide should be applied several days before seeding alfalfa.

Use interseeding only if more plants can be expected to become established and higher, long-term yields will result from more plants. Otherwise, do a total renovation using tillage equipment to prepare a clean seedbed.

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