

Planting Methods for Alfalfa

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A properly established and managed stand of alfalfa can remain productive for five to ten years. Alfalfa stands do not reseed naturally and continually thin over time, so excellent establishment is critical for long stand persistence. Careful attention to the planting process will ensure excellent establishment.

Site Selection

Site selection is very important for growing alfalfa. Alfalfa requires a deep, well-drained soil with good fertility for optimum production and stand persistence. Good soil fertility is essential for establishing and maintaining productive and persistent alfalfa stands. Fields should be soil tested well in advance of planting so that fertilizer and lime can be applied to correct deficiencies. Poor establishment and survival will result if alfalfa is planted in soil that is too acid or too low in fertility.

Soil fertility levels should be medium or higher for rapid and vigorous establishment. Target soil fertility levels for good establishment include a soil pH of at least 6.5, a soil test phosphorus level of at least 60 lbs per acre and a soil test potassium level of at least 250 lbs per acre. Follow soil test recommendations for the proper amount of lime, phosphorus, potash and boron fertilizer to apply before planting.

Planting Date and Seeding Rate

In general, the recommended range of seeding rates for alfalfa is 15-20 lbs per acre. Recent research has shown that higher yields can be obtained when higher seeding rates are used. For pure stands, 18-20 lbs per acre should be planted; for mixed stands 15-16 lbs per acre is sufficient. Seeding rates should be increased 10-20 percent for broadcast planting compared to drill planting because seeding depth is less uniform.

Alfalfa can be successfully established in spring or fall. The recommended planting dates for alfalfa in Arkansas during fall are September 1 to October 15 or in spring from March 1 to April 15. In north Arkansas alfalfa should not be planted in fall later than October 1, or in the spring, earlier than March 15. Fall planted stands must develop 3-4 trifoliate leaves to be winter hardy. Late fall planted stands may not develop sufficiently before the onset of cold weather. Late spring planted stands may not develop an adequate root system to resist summer drought and summer weed competition.

Weed Control

Fall planting is preferred since weed problems are less likely than for stands planted in spring. However, winter annual weeds or annual ryegrass can be significant problems

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in some fall planted fields. Heavy infestations of these weeds should be treated with herbicides to prevent excessive crowding of the new alfalfa seedlings. On spring planted alfalfa, weed control is required to prevent stand failure.

On conventionally tilled seedbeds, a pre-emergence herbicide should be incorporated into the soil before planting to prevent weed competition. Postemergence herbicides can be applied after weeds and alfalfa emerge if a preemergence herbicide is not used before planting. On no-till planted stands, only postemergence herbicides can be used since preemergence herbicides cannot be incorporated into the soil. For a current list of approved herbicides for alfalfa establishment, check the Extension publication MP44, *Recommended Chemicals for Weed and Brush Control*, available at the county Extension office.

Planting Method

Alfalfa can be planted by using conventional tillage methods or by no-till methods. Both planting methods can produce good stands if proper steps are followed. For either method, the seedbed should be firm, moist, fertile and weed-free for best results. Planting depth should be about 1/4 inch. Seed planted one inch or deeper may not emerge at all. Because of the variable field conditions, the depth of seed placement should be checked frequently during planting, regardless of the type of equipment or planting method used.

Conventional Planting

Conventional tillage is often the preferred method for establishing alfalfa. Tillage allows lime and fertilizer to be incorporated into the root zone to promote rapid plant establishment. It also allows incorporation of preemergence herbicides to prevent weed invasion during stand establishment. However, conventional tillage is a less desirable method for planting in rocky soil or on steep slopes since rocks will be plowed up or excessive soil erosion can occur.

Conventional planting involves tillage to develop a clean, crumbly, firm seedbed. Chisel plowing and disking will generally produce the desired result. The number of times the field must be worked depends on soil conditions. The final seedbed must be smooth enough for easy machinery operation since hay harvesting and other operations require many trips over the field per year. After the final disking, the field can be firmed and smoothed using a roller or cultipacker. Soil firmness can be judged by walking across the seedbed. On properly firmed soil, an adult's footprint should be about 1/4 inch deep. If the seedbed is too soft, the seed will be planted too deep, and if

the seedbed is too hard or cloddy, the seed may not make good soil contact, which impairs germination.

The ideal method for planting alfalfa is with a cultipacker-type seeder. This type of planter has two sets of cultipacker rollers. The first set of rollers firms the seedbed, seed is dropped between the first and second roller, and the second set of rollers pushes the seed into the soil. Alfalfa can be successfully planted with a seed drill that can be calibrated for small seed. If broadcast seeding techniques are used, the seedbed should be firmed with a roller or cultipacker before seeding. After the seed is broadcast, it should be covered with a roller or cultipacker.

No-till Planting

No-till drills plant seed in a shallow slice cut in the sod. Press wheels firm the soil over the seed. Alfalfa can be no-till planted into killed sod or into stubble from a preceding grain or annual forage crop.

Some primary differences between no-till planting and conventional tillage are in fertility management and weed control. Soil tests should be made well in advance (at least 6 to 12 months) of no-till planting alfalfa. This allows time for fertility deficiencies to be corrected. When using no-till methods, fertilizer and lime cannot be incorporated into the seedbed during establishment since tillage is not used. In cases where soil fertility is medium or high, lime and fertilizer may be applied on the surface at planting time. On low fertility soils, surface applied lime and fertilizer may not correct deficiencies quickly enough for immediate planting. On low fertility soils, it may take 6 to 12 months after lime and fertilizer are applied for fertility levels to reach suitable levels for successful establishment.

No-till planting methods use herbicides in place of tillage equipment for control of existing vegetation before planting. Non-selective herbicides such as glyphosate (e.g., Roundup) or paraquat (e.g., Gramoxone) are often used for killing the sod or existing weeds before planting. Pasture sod should be grazed or mowed to a three- to four-inch height before spraying and planting. The sod should be actively growing at the time of herbicide application for best sod suppression. It is difficult to achieve a total kill of the existing sod simply with the application of herbicide. Incomplete kill of the sod can result in excessive competition for the seedling alfalfa due to regrowth of the existing grass.

A system that has proven effective for converting grass sod to alfalfa is the spray-smother-spray method. With this method, fields must be prepared during the season prior to planting the alfalfa. Spray

the growing sod with a non-selective herbicide to kill the sod, then no-till plant an annual forage crop. The annual forage crop serves as a smother crop that helps reduce regrowth of any sod or establishment of weeds. Alfalfa is planted after the annual forage is harvested. Annual forages that work well are winter annual forages such as wheat or rye, or summer annual forages such as sorghum-sudan or pearl millet. These annual forages produce ample amounts of good quality forage during the rotation and are effective at shading out weeds.

For a fall alfalfa planting, spray the sod in spring after growth begins, plant a summer annual forage, then plant the alfalfa in the fall after the summer annual forage is harvested. For a spring alfalfa planting, spray the sod in the late summer or early fall, plant a winter annual forage, then plant the alfalfa the following spring after early hay harvest or grazing of the winter annual forage. Herbicide application is often necessary after the annual smother crop and before planting alfalfa to suppress any regrowth of the annual forage, as well as any other weeds or remaining sod.

Remove the residue of the annual forage to leave a clean field for planting the alfalfa. Heavy plant residue left on a field reduces soil penetration by the no-till drill resulting in poor seeding depth and placement. Seed planted in clumps of crop residue without reaching the soil will not establish.

Insect Control

Insect control can be critical for alfalfa no-till planted into grass sod. Insect pests, including grubs, wireworms, crickets, grasshoppers, etc., can cause serious seedling losses if not controlled. Research has shown better no-till stands are established when an insecticide is applied at planting than when no insecticide is used. Insecticide can be sprayed immediately after no-till planting and before the alfalfa seedlings emerge. Check with your county Extension office for approved insecticides to use for no-till planting of alfalfa.

Mixed Stands

Whether to plant pure stands of alfalfa or an alfalfa-grass mixture depends on the intended use of the crop and on available weed control options. Pure alfalfa hay generally has a higher market value than alfalfa-grass hay. Alfalfa-grass mixtures are more desirable if the field will be used for grazing or if a significant erosion hazard exists in the field.

More herbicide options are available for establishing pure alfalfa stands than for alfalfa-grass

mixtures. Some producers plant pure alfalfa to take advantage of a larger selection of herbicides for weed control at establishment, then drill in a companion grass after a few years as the stand begins to thin. Orchardgrass is the most common companion grass grown with alfalfa. It is planted at a rate of 3-5 lbs per acre.

Stand Emergence and Plant Development

Alfalfa planted at the proper depth, and with optimum moisture and temperature, will begin emerging in less than one week. Seed planted deeper than one half inch will emerge more slowly, and seed planted deeper than one inch may never emerge.

If proper planting methods are used and weather conditions are optimum, 25-30 plants per square foot should be visible within 30 days. Alfalfa stands thin rapidly during the first year and more slowly in subsequent years. Both crown size and the number of stems per plant tend to increase as neighboring plants die. A stand of at least 6-8 well-established plants per square foot is acceptable after the first year. For older stands, a minimum of 3-4 plants per square foot is needed to maintain acceptable yields.

Rotation and Replanting

Alfalfa stands do not reseed naturally, so stands continually thin over time. Well-managed stands should last an average of five years with some remaining productive for 7-10 years. Alfalfa cannot be replanted immediately after an old alfalfa stand because the old alfalfa produces autotoxic chemicals that can damage new alfalfa seedlings. This autotoxicity causes poor establishment of new alfalfa planted too soon after an old alfalfa stand. Autotoxicity can cause long-term yield reduction of new plants that do not become established, although the plants may appear normal. The autotoxic trait may have originated because alfalfa evolved as a desert plant around the Mediterranean area. Autotoxicity may have been a survival strategy to reduce competition from seedlings with established plants for scarce water resources.

Attempts at thickening declining or thin stands of alfalfa are seldom successful due to autotoxicity from the old plants. Established alfalfa plants can severely reduce establishment and growth of new alfalfa seedlings emerging within an 8-inch radius from the old plant. This means that an old alfalfa stand as thin as 0.75 plants per square foot would inhibit establishment of new plants over 100 percent of the field surface. The minimum stand recommended for maintaining hay production is three plants per

square foot; therefore, interseeding more alfalfa to thicken declining stands in this range is not feasible.

Research has shown that a one-year rotation out of alfalfa is sufficient for successful re-establishment of alfalfa in the same field. Rotation with small grains or summer annual forages such as sudangrass or millet works well. Methods similar to those used for establishing the original stand are acceptable for establishing a new stand. Varieties selected for replanting in fields with a history of alfalfa should have high disease resistance ratings to avoid stand losses from any diseases remaining from the previous stand.

Summary

Alfalfa is a high quality and high yielding forage. Both yield and persistence depend on establishment of a thick and vigorous stand. Alfalfa can be established by a variety of methods, but regardless of the planting method used, attention must be given to site selection, soil fertility, planting date, seeding depth, weed and insect control, and variety selection. For more details on methods and costs of establishing alfalfa, see FSA15, *Establishing Alfalfa*.

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