DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Agriculture and Natural Resources

FSA3164

Tips & Techniques for Forage Plantings

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Introduction

Pastures and hayfields can be one of the few crops that are not annually replanted. While some tall fescue and bermudagrass fields have persisted from an initial planting in the 1950s, most fields have been replanted once or twice over the past century. To maintain high productivity, most stands will need to be overseeded or replaced at some point. In other places and systems, stands are replanted more frequently. Forage stands in New Zealand are renovated on a seven-to-10-year interval. Turf is often renovated once every four to five years in professional settings. The 2012 NRCS Conservation Outcomes from Pastureland and Hayland Practices defines establishment as "the period between seeding and utilization of the vegetation for its intended purpose, which is typically at the time full canopy cover is achieved."

A suite of new forage varieties and cultivars has been introduced over the past 30 years, including seeded bermudagrasses, newer bahiagrasses and improved crabgrasses. Similarly, planting strategies and techniques have rapidly improved for forages, and pasture renovation and new equipment have improved establishment outcomes by improving seed growth. Most farmers will end up making a forage planting at some point in their careers. This factsheet outlines the decisions necessary to make a planting and increase the odds of establishment success.

Preparing to Plant

Starting with a Baseline

Few farmers are planting fields without a previous cropping history. Plantings made into existing stands will be subject to competition with the current vegetation. Even row crop fields will have a legacy seedbank. A baseline inventory is a prerequisite to making a forage planting.

This baseline will include a review of management records, a routine soil test and a pasture or hayfield inventory or stand assessment. Reviewing pasture management or hay production records can reveal that planting may not always be the best decision. For example, if a tall fescue stand thinned after four years of continuous grazing, changing

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grazing management might be a more cost-effective way to increase productivity. Similarly, routine soil testing can help with successful establishment. New forage plantings are more successful when soil fertility is adjusted.

A pasture or hayfield inventory is an assessment of botanical composition. There are several ways to accomplish this inventory, such as the step point method or with frequency-occupancy grids. Using these assessments, stands are then categorized as partially (<40 percent), moderately (40-70 percent), or fully functional (>70 percent). Partially functional stands will likely need to be completely renovated, whereas moderately functional stands might benefit from some over- or interseeding, along with other management changes.

Eliminating or Suppressing the Existing Sod

The preparatory phase for a perennial forage planting can take as much as one to two years before actual planting. Existing stands—even weedy ones—will inhibit new seedlings from getting established. Complete stand replacement should proceed only after the existing stand is eliminated. In the case of overseeding or interseeding, sod suppression is necessary. Sod elimination or suppression can be accomplished through the use of herbicides, tillage, fire, mowing or grazing. Even concentrated hay feeding can effectively remove existing vegetation.

Chemical fallows using regular burndown applications will eliminate the existing sod and control plants that emerged or persisted through previous sprays. This approach was historically applied in drier row crop systems in the Great Plains. Chemical fallows increase the opportunity cost of new plantings because no forage is grown between regular sprays. Chemical fallows can be effective where forage is not needed, such as in fields that have yet to be fenced for grazing.

Spray-smother-spray renovation is an integrated chemical and cultural system where burndown herbicide applications are alternated with quick-growing smother crops, such as sorghum-sudangrass, pearl millet or small grains such as oats or wheat. These smother crops can suppress weed seedling germination while also providing forage to offset the cost of conversion. For these reasons, spray-smother-spray renovation is the preferred method of pasture renovation when renovating fields between perennial forage crops.

Sod suppression herbicide applications are primarily made in the fall or late winter to facilitate the establishment of annual forages into warm-season grass sods. These applications are intended to stunt the warm-season forage and kill some of the weeds present in the stand.

Tillage can eliminate the existing sod by cutting, churning or otherwise mixing the topsoil. Tillage is requisite to create a conventional seedbed (see Seedbed Preparation below) and can be accomplished by means of moldboard plow, disk, chisel plow or rotary tiller. Different tillage approaches will result in different levels of disturbance and sod suppression. Techniques that invert or completely stir the soil, such as moldboard plowing or rotary tillage, will eliminate existing plants but might encourage a flush of weed seed germination. Disking might only eliminate 30-50 percent of the existing sod, depending on the angle of the disks. Tillage is often limited to deep and level soils in Arkansas, which precludes most pasture and hayfield acreage in the state. Although tillage is an effective tool for sod suppression, it can negatively affect soil structure and soil organic matter, so tillage should be avoided or minimized when possible.

Fire can be used to suppress sods, but the timing of fires often affects sod growth. Late winter and spring burns can speed up greenup of existing cool-season and warm-season perennial forages. Fuel loads in most pastures will be too low to get soil temperatures high enough to kill weed seeds. Additionally, the forage burned as fuel often still has some nutritional value for livestock.

Mowing or grazing to deliberately set back or eliminate an existing sod is a desirable cultural strategy. The standing forage crop feeds the herd or flock, and concentrated hoof action can work the soil surface similar to tillage. Winter hay-feeding areas are often turned into muddy messes; planning to feed hay on poor pastures as part of a pasture planting can help with eliminating the sod. Deliberately overgrazing, or

grazing sods close to the ground, can also be an effective strategy for sod suppression when overseeding clovers or winter annuals in perennial stands. A good rule of thumb is that when a golf ball is visible when thrown into the stand, then the existing sod is sufficiently grazed or clipped.

Seedbed Preparation

Conventional seedbed preparation involves tillage (plowing and/or disking) to eliminate the sod and create a bare soil surface. The soil should be prepared when moist: neither too wet nor too dry. If a ball of the soil crumbles when poked, then the field is ready to be prepared. The seedbed should not be fluffy, clumped or cloddy. A firm seedbed is ideal. Conventional seedbeds can be at risk for soil erosion or delayed planting times and can require a long preparation period. However, conventional seedbeds can speed up plant emergence, contribute to organic weed control and break disease or pest cycles.

No-till preparation involves chemical or cultural sod suppression followed by planting, most often using a no-till drill to place the seed in the soil. This approach was developed in the 1970s for soil conservation as well as labor efficiency. No-till plantings often require fewer trips over the field than conventional plantings because the tillage step is not required. These plantings can often reduce the amount of weed seedling emergence better than conventional seedbeds because the weed seeds are mostly kept deeper in the soil profile. Most forage plantings in Arkansas are made without full conventional seedbed preparation because of soil conditions or topography. No-till plantings often require chemical sod suppression that may be prohibited under certified organic production.

Figure 1. A drag harrow being pulled behind a tractor as part of a broadcast seeding.

Planting Techniques

Seeding Rates

Seeding rates often need to be increased 25-50 percent above recommendations when broadcasting seed or using a seeder in comparison to using a no-till drill. Seed placement in contact with the soil is crucial to the seed germinating and emerging. Increased seeding rates guarantee that seedlings will establish in sufficient density to produce a stand. Please consult FSA2139, *General Traits of Forage Grasses Grown in Arkansas*, and FSA3137, *Annual and Perennial Clovers in Arkansas*, for seeding rates and planting dates of common forage grasses and clovers, as well as other forage fact sheets available online and at the local county extension office.

Broadcasting

Broadcasting or spreading seed onto the seedbed is one of the most common forms of planting forages in Arkansas. Spinner seeders are fairly inexpensive and common at equipment dealers as well as farm stores. Drop spreaders, sometimes used to apply fertilizer, are ideal for broadcasting seed and fertilizer mixtures. Spinner seeders often produce variable bands as a function of a spinner unit. Dr. Dale Wolf of Virginia Tech measured the variability of different broadcast seeders in the 1990s and found wide variability in spinners. In contrast, drop seeders often meter out seed more evenly across the width of the planting unit.

Broadcasting should be followed by cultipacking in conventional seedbeds and by dragging or light disking in no-till situations (Figure 1). These actions incorporate the seed into the soil surface and improve seed-soil contact for germination and subsequent emergence. Broadcasting works well for very small-seeded forages such as clovers and quick-germinating forages such as annual ryegrass and crabgrass. A drag harrow, positioned so that the smooth portion of the harrow or the less aggressive tine angle is used, is ideal in most planting situations.

Seeding

Seeders are slightly older pieces of equipment that meter out seed onto the soil surface. This equipment often works similarly to a drop

spreader, but might include cultipacker rolls to push seed into the soil surface. Brillion seeders are a historic example of this technology. Seeders are generally cheaper than no-till drills and more expensive than broadcast units. Large drop spreaders (e.g., Gandy) can be retooled as seeders but will require cultipacking or dragging as discussed for seed broadcasting. Drop spreaders deposit seed in a more even pattern than most broadcast spreaders but might not work effectively on extremely rough ground or in tall vegetation. Often ground clearance is low on these types of seeders.

Drilling

Drilling is the best planting technique to both meter out seed and ensure good seed-soil contact when planting perennial forage crops. Disk openers will cut furrows where seed will be dropped before a press wheel follows to close the furrow. With this technique, soil is minimally disturbed and seed is placed at an optimum depth for seed-soil contact. Older grain drills may work effectively in very sandy soils, but often cannot effectively plant many forages in soils with higher clay content. No-till drills are heavy in order to cut furrows, and the necessary tractor horsepower needed to pull a drill needs to be known when selecting a drill to rent or purchase. Drills are sometimes available through the local conservation district (Figure 2). These plantings are often constrained by equipment availability, as not everyone has access to a no-till drill.

Drill purchases should be weighed against the additional seed costs incurred using other planting techniques. In a 2025 comparison of

Figure 2. No-till drills are the most effective planting tool for many forage seeds.

equipment and seed costs, farmers would need to plant at least 400 acres to justify purchasing a drill over a broadcast seeder. Direct ownership of a drill might make the most sense if forage plantings are made regularly or if stands are regularly replanted. Most Arkansas operations would be better served sharing a drill cooperatively or renting a drill as needed.

Summary

Establishment can be the most challenging part of improving a forage system. Planting starts with a baseline assessment to compare maintaining a current stand against planting a new stand. Understanding when and how to establish new forages within existing stands is critical to justifying the effort and expense of a new planting. Not all preparation and planting techniques will produce the same results. By comparing these tips and tricks for forage plantings, farmers can identify the best options for their respective fields.

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FSA3164-PD-5-2025