University of Missouri Extension

G4650, Reviewed August 1996

Establishing Forages

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Avoid forage seeding failures by using research-proven procedures. Seeding failures are costly, not only in seed and labor cost, but in providing inadequate feed the following year.

Adequate moisture, temperature, plant nutrients, air and light are necessary for plant growth. These may be affected by time of seeding, seedbed preparation, seed quality, analysis and amounts of fertilizer, fertilizer placement, and manipulation of competing species such as weeds and/or companion crops.

Time of seeding

The most successful seedings are made during or just prior to periods of cool, moist weather. Most forages may be seeded in the early spring, late summer (Aug. 15 to Sept. 15), or mid-winter. Sow annual lespedeza and sweet clover only in mid-winter or early spring. Birdsfoot trefoil is usually spring seeded, but under optimum moisture conditions may be fall seeded before Aug. 31. Orchardgrass should not be fall sown except in the southern half of the state. **Do not** no-till seed alfalfa in the fall in south Missouri, due to potential stand loss caused by sclerotinia crown rot.

Spring seedings

Make spring seedings as early as possible. These seedings are best made in one of the following ways:

- Seeded with spring oats and the oats harvested for pasture or hay. Experimental results indicate the combined yield of oats and forage make this a very economical way to establish new seedings; or
- Seed in late March, April or early May without a companion crop but using chemicals to control weeds. This is often the best way to establish birdsfoot trefoil in old bluegrass sods in northern Missouri.

Late summer/early fall seedings

When moisture is available, August and early September are ideal periods for seeding forages to harvest a full crop the next growing season. Fall seedings escape much weed competition and, if moisture is adequate, establish strong root systems for early growth in the spring.

Wheat may be used as a companion crop with fall seedlings. It not only helps control erosion but may be pastured in the fall. Spring growth also should be pastured or cut early for hay. If fall moisture is limited, the wheat may be sown and the legumes and grasses overseeded in late January or February.

Winter seedings

Legumes and slick-seeded grasses such as timothy may be seeded in fall-sown grains during the winter. If the

seed is broadcast in the small grain while the soil is frozen, the seed will be covered and good germination will occur. If seedings are delayed until late spring, band seeding the forages with a grain drill with additional phosphorus fertilizer will help them become established more quickly than if broadcast.

Forages winter-seeded in small grains may suffer from lack of moisture and light because of competition from the taller growing crop. In this case, pasturing or cutting the small grain for hay will increase the chances of getting a good stand in forages.

Companion crops

In most of Missouri, it is possible to plant small grain with the desired forage if it can be used as pasture or harvested for hay. Always use a wheat variety resistant to the Hessian fly. Most studies show that cover crops such as wheat reduce weeds, control erosion and furnish winter protection to young seedlings.

Small grains may suppress forage seedling growth if they are allowed to mature and are harvested for grain. But if they are removed early as hay or pasture, they will not interfere with seedling establishment. Used in this manner, wheat or oats will usually furnish the equivalent of 2 to 3 tons of hay, which can substantially offset much of the original seeding cost.

Reducing the seeding rate of wheat will not necessarily favor the new seeding. Stooling will equalize the stand of wheat from any reasonable variation in seeding rate. With spring sown oats, however, it is usually desirable to reduce the normal oat seeding rate by approximately one-third.

Winter barley, rye, and oats are less desirable than wheat as a companion crop because their heavy, early growth competes with the young seedlings.

Seeding failures in companion crops

A wheat or oats crop that is fertilized and managed for high grain yields is extremely competitive to young forage plants. If a history of forage seeding failure is present on farms that produce heavy grain yields, it may be necessary to make late summer seedings after grain harvest. Even with the new short wheat varieties, it is difficult to achieve both large grain yields and successful forage stands at the same time.

Forage seeding failures with spring oats harvested for grain do not occur as often as with wheat. However, failures happen often enough to warrant harvesting the oats crop for hay or pasture.

Methods of seeding

Seedings are usually made in one of three general ways:

- Broadcasting
- Conventional grain drill
- With some specialized type of cultipacker seeder.

Broadcasting

Broadcasting is the least desirable seeding method, especially for late summer seedings, but probably is the most widely used. Efficiency of a broadcast seeding can be greatly increased by rolling or cultipacking the seedbed before and after the seed is planted. Cultipacking after seeding also will leave a surface that is less

likely to crust than a smooth one.

Broadcasting can be a satisfactory method of sowing some grasses and most legumes on fall seeded small grains in mid-winter. Grasses with light, chaffy seeds are not recommended for mid-winter broadcast seeding. These seeds will not work their way down into the soil as well as smaller seeded legumes. A mid-winter seeding made when the soil is honey-combed with frost will soon be covered with sufficient soil for germination.

Seeding with a grain drill

Forages may be seeded with a conventional grain drill equipped with a grass seeding attachment. These usually have short metal tubes that scatter the seed in front of the furrow openings. Seeds of similar size and weight may be mixed and seeded together. Lighter seed, such as orchardgrass and tall fescue, may sift to the top if mixed with heavier seed and require frequent mixing and stirring to obtain uniform distribution.

Bromegrass seed, which is light and chaffy, tends to bridge over seeder openings. It is sometimes mixed with oats or fertilizer and drilled through the grain box. Take care not to seed too deep if this method is used. If fertilizer is used with this method, avoid those high in nitrogen or potash because of danger to germination. High phosphate fertilizer such as 0-46-0 or 18-46-0 is ideal for this method of seeding.

Band seeding with a grain drill

Band seeding (Figure 1)has two advantages over broadcasting:

- Stands are stronger and more vigorous
- Seeding rates can be reduced by one-fourth

This seeding method usually results in a 30 to 50 percent increase in seedling survival, more vigorous plants, and higher initial yield.

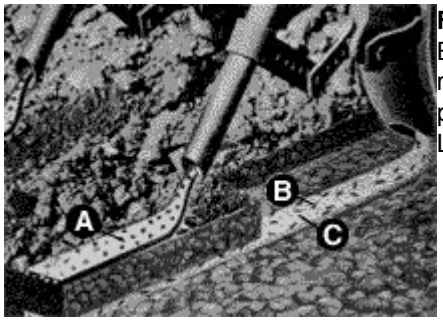

Figure 1
Band seeding places the seed directly over the phosphate fertilizer where seedling roots can easily reach the fertilizer. This seeding mehod ususallly results in 30-50 percent increase in seedling survival, more vigorous plants, and higher initial yield. (A) Legume seed, (B) companion crop seed, and (C) fertilizer.

The principle advantage of band seeding is that it is possible to place a layer of phosphate fertilizer directly under the band of seed. A thin layer of soil separates the seed from the fertilizer. This practice is especially helpful in low phosphate soils or where much of the plowed down fertilizer has been applied as rock phosphate.

Conversion to band seeding is relatively simple if the grain drill is equipped with a grass seeding attachment. The short tubes from the grass box are replaced with longer ones that are fastened behind the grain-fertilizer outlet. Grass and legume seed is placed directly over narrow bands of fertilizer and well behind the openers so that the seed is not buried too deeply. Attaching a cultipacker behind the drill to pack the soil following seeding is helpful. Remove drag chains when band seeding.

Specialized cultipacker seeders

Several seeders are available that will seed and pack in one operation. Most of them consist of two sets of corrugated rollers with a seed box mounted on top of the frame directly between the two rollers. Seed is dropped between the corrugated rolls that pack the soil below the seed and then around it. These do an excellent job of seeding, primarily because they ensure a firm seedbed and even distribution of seed that is not sown too deeply in the soil.

Legume seedings with pesticides

Legume seedings may be made from late March through May if herbicides are used to control weeds. These herbicides include:

- Balan or Eptam, applied pre-plant incorporated, to control some broadleaf and grass weeds.
- Post, applied post-emergence to control various grasses, and
- 2,4-DB, applied post-emergence to control some **immature** broadleaf weeds.

The use of grass herbicides such as Balan, Eptam and Poast prevent seeding a desired grass with the legume. In order to achieve a mixed stand, plant the legume in the spring using herbicides and drill the desired grass in the fall.

The increased stand density and first year yield makes the use of herbicides very attractive in legume establishment.

Seeding no-till with insecticides

When new seedings of grasses or legumes are made no-till into a chemically suppressed sod, soil insecticides will improve stand density and yield. Either apply 1.0 pound per acre [active ingredient (AI)] of diazinon granules in the furrow or broadcast spray 1.5 pounds per acre AI of the liquid formulation. Diazinon is presently the only compound labelled for soil insect control at forage establishment.

Seed, seeding rates and mixtures

Select quality seed and use recommended varieties. Many times seeding failures and unhealthy stands are blamed on the weather, fertilizer rates, and numerous other causes when poor quality seed is often the problem. Seed should not only be alive, but should have vitality, which relates to its age, its maturity, and the conditions under which it was stored. Use certified seed of recommended varieties if available, and purchase from a reliable source. Poor seed is never a bargain at any price.

Methods of seeding forages have generally been poor, and there is often a tendency to use high seeding rates to compensate. However, excessive rates will usually result in reduced stands and yields. Too much seed results in more plants, but they are smaller and there is little or no increase in yield. The following season the number of plants will be reduced because of competition.

Keep seeding mixtures simple for best results from hay and pasture crops. Grasses and legumes sown in combination should be similar in palatability, maturity patterns and growing vigor. Use mixtures of only one grass and one or two legumes because of difference between grasses. "Shot-gun" mixtures result in spotty grazing, wasted forage and reduced yields.

Inoculation

Inoculate all legume seeds at seeding time regardless of the previous crop grown. Inoculation enables the legume to "fix" atmospheric nitrogen and make it available to the growing plants. Sow as soon as possible after inoculation, and keep the inoculated seed in a shady place between time of inoculation and planting. Seed held more than 24 hours should be re-inoculated before planting.

Many seed companies sell pre-inoculated seed. This method of inoculation is effective if the seed is stored in a cool area and sown three to four months after treatment. If there is any doubt or if the seed is carried over from the past year, re-inoculate before seeding.

Inoculation of alfalfa and other legumes is sometimes difficult to obtain on strongly acid soils that have been recently limed. If lime is necessary, apply at least part of the requirement six months prior to seeding legumes.

Seedbed

Lack of soil moisture is the big enemy of small forage seeds during the germination period. A firm, well packed seedbed is needed so that moisture will move upward and prevent the soil from drying out. Rolling or cultipacking before seeding firms the soil below the seed. Rolling after seeding packs the soil around the seed and provides good moisture contact between the seed and the soil. Rolling **after** seeding helps seedlings get a quick, vigorous start.

If a seedbed is to be compacted only once, do it before seeding. This will make a firm seedbed and prevents seeding too deeply in the soil. Don't sow forage seeds deeper than 1/4 to 1/2 inch in the soil. Even when seeds emerge from greater depths, they are often so weak that survival is rare.

Methods of seedbed preparation depend on the steepness and rockiness of the soil and the existing vegetation. Plowing is often the most satisfactory way to start seedbed preparation, especially for late summer seedings. A field cultivator may also be used.

If the land is steep and/or rocky with a serious erosion hazard, use a cutaway disc or field cultivator. Kill the existing vegetation and leave it on or near the surface as a mulch. The mulch may seem to be a nuisance at seeding time, but it offers protection for the small seedlings as well as erosion control.

Lime and fertilizer

Adequate lime is necessary for forage establishment and production. It serves to correct soil acidity and supplies calcium and magnesium. Lime also affects the availability of most of the other essential elements needed for forage production. Phosphorus availability, in particular, increases as the pH is increased. If the soil is extremely acid, it is best to apply part of the lime at least six months before seeding. A soil test will help determine the amounts of lime, phosphorus and potassium that should be plowed or disked into the soil before seeding.

Seeds can germinate with or without fertilizer, but young plants will soon use the small amounts of nutrients in the seed. They are then dependent on the level of fertility around them for development. Most research shows that available phosphorus, applied at seeding time and properly placed, is the key element in establishing legumes and grasses. A small amount of banded nitrogen and potassium may also be beneficial at seeding time, but do not include more than 50 to 60 pounds of a combination of nitrogen and potash in a starter fertilizer.

Nitrogen encourages above-ground vegetative growth; phosphorus encourages root development, particularly the lateral and fibrous rootlets. Quick root development is especially important in fall sown forages. A sturdy root growth will counteract winter injury and prepare the plant for rapid spring growth.

A starter fertilizer should consist primarily of phosphorus (40 to 80 pounds) and a small amount of nitrogen (20 to 30 pounds). It may contain some potash, but excessive amounts at seeding damage legume and grass seedlings. Although high potash levels are detrimental to new seedlings, established stands of grass-legumes need a liberal supply. Use soil tests to determine the amount of phosphorus and potassium to use for topdressing. It is best to take a new test every three or four years.

Managing new seedings

Weeds, lack of moisture and overgrazing are the most serious problems for newly established stands of grasses and legumes. If weeds are a threat, mow them. They are best controlled when permitted to grow tall before mowing and then cut short. A rotary mower is usually superior to a sickle mower because it tends to mulch the weeds and prevents smothering the young plants.

Spring sown pasture should be grazed just often enough to use the oats and prevent them from shading the new seedlings. Avoid trampling in wet weather.

When the new seeding is grazed, do not graze shorter than 4 inches.

Fall sown pasture will furnish considerable feed the first spring and summer following seeding. Use rotational grazing and leave a stubble at least 4 inches high. Protect the new pasture from grazing after Sept. 15 in the first grazing season. Give it a chance to prepare for winter by storing food in the root system. It can't do this if the top growth is removed during early fall.

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Related MU Extension publications

- G4652, Seeding Rates, Dates and Depths for Common Missouri Forages
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4652
- MP581, Weed and Brush Control Guide for Forages, Pastures and Noncropland
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=MP581

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