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Establishment Techniques

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The method used for establishing perennial forages can make the difference between a long-lived good stand or a poor stand requiring reestablishment. A uniform stand with an adequate number of plants is necessary for maximum yield. Use of an appropriate seeding rate at the proper time of year, coupled with suitable fertilization, will maximize the odds for establishment success. Alfalfa will be stressed here, but most of the establishment techniques discussed apply to other legumes and grasses.

Species and Site Selection

It does not matter if correct seeding and establishment procedures were used if the wrong seed was planted. Species selection is critical for successful establishment. For forage producers, this depends on the suitability of the land, and whether or not there is a market for the particular forage produced. Legumes or legume/grass mixtures will almost always result in a higher quality feed produced, compared to pure grass stands.

In general, if you have "alfalfa land", then consider planting alfalfa. 'Alfalfa land' is generally fertile, pH 6.6-7.2, with adequate drainage and low heaving potential. ? If soil pH is too low, or drainage is poor, consider planting red clover or birdsfoot trefoil. If heaving is a concern, plant the legume with an acceptable grass, such as orchardgrass to reduce the potential for heaving. If bloat is a concern when grazing legumes, a legume/grass mixture or a non-bloating legume will reduce the potential for bloat.

Perennial grass species used throughout Indiana include tall fescue, orchardgrass, smooth bromegrass, and timothy. Orchardgrass is able to withstand a 4-cut alfalfa system and is generally the best grass to plant with alfalfa. If tall fescue is planted, a low-endophyte variety should be chosen to reduce problems with palatability and animal performance. A variety of annual grass species may be planted as emergency or supplemental feed, such as sorghum-sudangrass, pearl millet, or small grains.

Variety Selection

Alfalfa seed should be certified to guarantee high quality, with freedom from noxious weeds. There are about 30 new certified alfalfa varieties released each year, and over 150 to choose from when selecting a variety. There is some variation between varieties for yield, but the main factor differentiating varieties is resistance to insects and diseases.

Alfalfa breeders are selecting for higher quality, and one method is to select for more than three leaflets per leaf. "Multileaf" alfalfa varieties are currently marketed, with a premium price paid for the multileaf characteristic. Although these alfalfas may be higher in forage quality, this may or may not be due to the multileaf trait. Research completed to-date does not substantiate claims of significantly higher quality in multileaf plants compared to normal trifoliolate (three leaflets/leaf) plants.

In the case of legumes or grasses, it is important to select a variety adapted to your area. For alfalfa in Indiana, this means a fall dormancy rating of three or four. Perennial grass varieties should be selected which are adapted to the Midwest.

Seedbed Preparation

A seedbed should be prepared as if for corn, then go over the field once more. A cultipacker or roller may be needed to firm up the seedbed before planting. When walking on the seedbed, your foot should not sink in more than about one inch. A firm seedbed is necessary, particularly for small seed such as alfalfa. If the field is overworked, however, a crust may form after a rain and prevent seedling emergence. This may occur in fine-textured heavy loam or clay soils.

Seed Preparation

Legume seed must be inoculated with the proper rhizobium bacteria to ensure maximum nitrogen fixation. This is critical if birdsfoot trefoil is sown. Coated seed may be purchased which contains rhizobium bacteria, lime, and/or other nutrients bonded to the seed. To date, seed coating has not been shown to significantly improve establishment of legumes, but more testing is needed.

Forage seeding rates for grasses, legumes, and mixtures can be found in AY253, 'Forage Selection and Seeding Guide for Indiana'. For alfalfa, the current recommended seeding rate is 15 lbs of pure live seed (PLS) per acre. If planted in a mixture with one grass species, then the rate is 10-12 lbs PLS per acre. Orchardgrass (5 lbs PLS/acre), smooth brome grass (6 lbs PLS/acre), or timothy (3 lbs PLS/acre) may be planted with alfalfa, but orchardgrass is preferred.

Liming and Fertilization

A complete soil test should be taken from the area to be seeded six months to a year in advance of seeding. If pH is low and lime is needed, it should be worked into the soil at least six months in advance of seeding. Phosphorus and potassium must be applied to meet the soil test recommendations. On light soils, it may be advantageous to apply 15 to 20 lbs per acre of nitrogen fertilizer as a starter for alfalfa. For perennial grasses, up to 50 lbs per acre of nitrogen fertilizer can be applied.

Time of Seeding

In northern Indiana, August 7 through August 20 is the best time for late-summer seeding; in southern Indiana, August 15 through September 1 is best. Seedlings need about six weeks of growth before the first killing frost to survive the winter.

A spring seeding also is possible in early to mid. April, as soon as the soil has dried enough to be worked properly. Legumes such as red clover can be successfully broadcast seeded in February or early March before the frost is out of the ground, but this is a questionable method for alfalfa seeding.

Companion Crop

Early maturing spring small grains can be planted with alfalfa in the spring to replace growth of weeds and to provide a source of forage. Small grains, however, do compete with alfalfa for light, moisture and soil nutrients. The herbicides Eptam or Balan can be preplant incorporated to control weeds in a pure alfalfa stand. Do not use these herbicides if establishing a legume/grass mix or using an oat companion crop.

Seeding Methods

The goal of seeding is to uniformly distribute the correct amount of seed and cover the seed with 1/4 inch of soil, forming a firm contact between seed and soil.

A. Cultipacker Seeder

Use of this seeder, consisting of two corrugated rollers with a seed box in between them, is an excellent method for obtaining good seed-soil contact. If planting conditions are good, then this is the preferred method for planting. If fertilizer is required, it must be applied with other equipment. In sandy, coarse-textured, droughty soils it may be necessary to plant deeper than what can be done with a corrugated roller.

B. Band Seeder

Band seeding can be accomplished by extending the seed tubes of the small seed attachment on a grain drill to within 2 to 4 inches of the soil surface. The seed will fall in a band directly over a band of fertilizer which was placed 1 to 2 inches deep. The seed is covered by press wheels or a corrugated roller. This is the most reliable method to establish a seeding under adverse conditions. If smooth brome is seeded with alfalfa, use the grain box for the large, fluffy brome seed, and alfalfa in the small seed box.

C. Grain Drill

An unmodified grain drill can be used for planting small seeded grasses and legumes, but is not as effective as the two methods described above. A corrugated roller can be used behind the drill to improve seed-soil contact.

D. Broadcast Seeding

On land that is hilly or rough and conventional tillage is not practical, seed can be

broadcast in February or early March before the frost is out of the ground. Freezing and thawing in the spring will work the seed into the soil. This works very well for red clover, reasonably well for perennial grasses, and works poorly for alfalfa.

E. "No-till" Planting

A no-tillage drill can be used to plant small seeded grasses and legumes into an existing grass sod or legume stand. This is done at sites too rough or erosive for conventional tillage. Existing vegetation must be killed or suppressed to allow seedling establishment. Spring seedings are preferred because of better moisture conditions. Leafhoppers may be more of a problem with a spring no-till seeding compared to other methods.

It is not recommended to seed alfalfa into an established alfalfa stand or to plant alfalfa in a field that had been in alfalfa. Alfalfa produces an autotoxin which inhibits the establishment of new plants in an old stand. The toxin gradually breaks down after the old stand is killed. Success rates are better if at least one month elapses after plowing before attempting to plant alfalfa in a previous alfalfa field. A better procedure is to plow in the spring, plant a short season crop for spring and early summer, and then plant alfalfa in the late summer.

Seeding year management depends on whether a companion crop, weeds, insects, or disease are present. If a companion crop is present, it should be harvested at the boot to heading stage to prevent lodging. The second harvest after removing the companion crop will depend on weed competition. If weeds develop to the point of smothering the alfalfa, cut low to kill the weeds. Otherwise, harvest when the alfalfa begins flowering. Do not harvest in the six week period prior to the first killing front. With a spring clear seeding (no companion crop) two to three harvests of alfalfa are possible in the seeding year.

Whether dealing with high management (eg. alfalfa) or low management (eg. tall fescue) perennial forages, a successful establishment phase is essential to a long-lived, productive stand. Although weather may negate the best establishment techniques, good technique will maximize your chances of getting successful establishment.