

AGR-64  
ESTABLISHING FORAGE CROPS  
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Successful livestock programs are dependent on forage programs which supply large quantities of adequate quality, home-grown feed. A major percentage of the feed units for beef (78%) and dairy (66%) cattle come from forages. Such forage programs do not develop by chance, but are the result of careful planning and close attention to the details of establishment, production and utilization of feed crops.

Establishment of a good stand is a first and very important step in a successful forage program. The costs of stand establishment are equal to approximately 1 to 2 tons of production. It is important that everything possible be done to ensure success, because a stand failure can nearly double these costs. Several factors which are of vital importance in the establishment and maintenance of good forage stands include:

1. Match plants to soils.

There is wide variation in soil capabilities on almost every farm. Soils differ in their capacities to supply nutrients and vary in slope, internal drainage and other factors which affect both production and persistence of a given forage crop. In addition, different grasses and legumes and grass-legume combinations vary widely in their abilities to persist and produce on different soils. It is important to match the plant species or mixture of species to the different soils so that greatest returns can be realized as well as proper soil and water conservation.

The best use of level-to-gently sloping, deep and well-drained land would be to plant the highest producing crops such as corn silage or alfalfa or a mixture of alfalfa-orchard grass or alfalfa-timothy. Steeper land should be maintained in sod-forming grasses such as tall fescue or bluegrass to minimize soil erosion. Alfalfa should be used with a cool season grass where soils are at least 2 feet deep and well drained. On soils which are less than two feet deep, or are poorly drained, clover-grass mixtures or pure grass stands may be used. Legumes may be established in grass-dominant sods through renovation. For more information on pasture renovation, see Cooperative Extension publication AGR-26, "Renovating Grass Fields."

2. Match plants to the intended use.

Plan for maximum quality and versatility in the forage program. Select plants that produce high-quality feed and plan to use each field for hay, silage, and/or pasture as weather and feed needs dictate. Legumes generally produce higher-quality feed, resulting in higher animal performance than grasses. Thus, legumes should be used to the maximum extent possible. Taller-growing legumes such as alfalfa and red clover are more versatile than a legume such as white clover, which is used primarily for grazing. Grasses such as orchard grass, timothy, and tall fescue are better adapted than bluegrass for hay and silage.. Some farmers want pure alfalfa for horses or dairy cattle. Timothy-alfalfa mixtures work well for this use, since most of the timothy growth is removed each year at the first cutting. The grass helps control weeds and aids in getting the first hay harvest cured, but subsequent harvests during the season are almost pure alfalfa.

### 3. Select high quality seed of an adapted variety.

High quality seed is an essential step toward establishment and longevity of a forage stand. Such seed should have a high percent germination and purity, low percentages of weed seed, and freedom from noxious weed seed.

Another important step is the selection of improved crop varieties which are adapted to your geographic location. If you are uncertain regarding a variety's adaptation and performance, check with your County Extension Agent for Agriculture or the Department of Agronomy, University of Kentucky, before seed purchase. It is never a good practice to plant large acreages to varieties of unknown performance or adaptation. The best assurance of the genetic purity of the variety selected is to plant certified seed, if available. Poor quality seed and/or unadapted varieties are never a bargain, at any price.

### 4. Supply proper fertility.

Just as man and animals must have food to survive, so plants must have proper nutrition if they are to survive and produce well. The soil is a vast reservoir of many nutrients needed by plants; however, soils vary widely in their nutrient status and a deficiency of one element can limit forage plant growth and encourage weed encroachment. The most sensible approach to providing balanced fertility is to test the soil to determine nutrient levels and keep good records of the fertilizer and lime applied to each field. In Kentucky the fertility factors most limiting to growth are normally lime, nitrogen (N), phosphorus (P), and potassium (K). Boron (B) is always recommended for use where alfalfa is to be grown or where red clover is to be harvested for seed.

Prior to establishing a new stand, lime, phosphorus, and potassium should be applied as the soil test indicates they are needed. Where the cropping history of a field indicates nitrogen is needed at seeding, it is usually recommended at the rate of 30 lbs. per acre on grass-legume mixtures and 50 lbs. per acre for straight grasses. Annual applications of fertilizer should subsequently be made as soil tests indicate need.

### 5. Prepare an adequate seedbed.

The soil should be tilled to incorporate lime and fertilizers, destroy weeds and other vegetation, and prepare a level, firm seedbed. Ridges and depressions should be reduced to a minimum to make harvest-machinery operation easier. Don't forget, this stand may be in the field for several years, so it is worth a little extra effort to get the soil surface smooth.

### 6. Inoculate legume seed.

When properly nodulated, legumes such as alfalfa and clovers have a unique ability to convert large quantities of nitrogen from the air into a chemical form which the plants can use to make protein and other nitrogen compounds necessary for growth. To insure proper nodulation, inoculate all legume seed with the proper bacteria just prior to seeding. This should be done even if the legume to be seeded has been grown in the field previously. To ensure that inoculum is stuck to each seed, use an appropriate commercial adhesive or sugar solution. Satisfactory results are obtained when a small amount of sugar solution is first added to seed and thoroughly mixed to get all seed moist, not wet. Then add the inoculum and mix again. If done properly, the peat in the inoculum mix will absorb excess moisture so seed will flow well through the seeder.

#### 7. Use proven seeding methods.

Seeding can be done using aircraft, cyclone-type seeders, band seeders, cultipacker seeders and drills with forage-box attachments. Each method can be successful when seed are properly distributed, placed uniformly just below the soil surface (1/8-1/4 inch), and firmed to give good seed-soil contact. Remember though, if the seed are placed too deeply they may not emerge. If they are placed at unequal depths, the stand will be uneven due to different emergence times. Also, remember that both the seed and the inoculum on legume seed must survive the seeding method. Both seed germination and inoculum effectiveness may be lowered when mixed with fertilizer. Some cover over the seed aids inoculum survival and provides better seed-soil contact.

#### 8. Seed at the right time with the correct amount of seed.

Many cool season grasses and legumes can be successfully seeded in either spring or late summer. Alfalfa, red clover and white clovers are usually most successfully seeded in spring; however, late summer seedings can be successful if soil moisture is adequate. Late-summer and early-fall seedings of such crops as alfalfa, fescue, bluegrass, timothy, orchard grass, ryegrass, and small grains for forages are preferred by many farmers since it enables them to prepare seedbeds during favorable weather conditions and spread the year's work more evenly. In addition, weed problems are often less than with spring seedings.

Lack of adequate moisture for germination and emergence is perhaps the major problem with late summer seedings. Cultipacking to get good seed-soil contact is highly desirable. Legume seed may be germinated by a small shower of rain and then perish during an extended dry period which follows. One technique for avoiding some of the problems when dry conditions exist is to have everything ready to seed but wait for at least an inch of rain before seeding. Seed as soon after the rain as soil conditions permit. This will usually ensure that enough soil moisture is present not only to germinate the seed but to get the young, developing roots into moist soil. If rain doesn't come early enough to get plants established, the seed may be planted the following spring. For information on seeding rates and dates, see Cooperative Extension publication AGR-18, "Grain and Forage Crop Guide for Kentucky."

#### 9. Control pests.

Pests such as insects, diseases, and weeds can lead to poor stands. Herbicides and insecticides may be used as necessary to control some pests. For information concerning these chemicals, consult your local Extension office for types of materials recommended as well as rates and times of application. When using any pesticide always read and follow all label directions and precautions.

To predict the probability of success when so much depends on weather is hazardous. The steps outlined above do not guarantee success, but if followed, they can certainly increase the probability of obtaining thick, vigorous stands. Once these stands are obtained, the forage must be marketed directly or through livestock products, and perennial plants must be managed to keep stands for several years if top profits are to be realized. Such management can reduce or at least minimize the reestablishment costs which can occur in forage crops.