

## ESTABLISHMENT AND EARLY MANAGEMENT OF ALFALFA STANDS FOR HAY AND SILAGE PRODUCTION

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To achieve high levels of productivity and long-lived alfalfa stands, farmers must treat alfalfa as a crop and not as a pasture on the back forty. In this paper we present current recommendations for establishment and early management of alfalfa stands in Kentucky. See AGR-76<sup>1</sup>, Alfalfa-The Queen of Forage Crops, and AGR-64, Establishing Forage Crops, for more detailed information.

### Choice of Field

Alfalfa can be grown on many classes of land but high productivity and long-term persistence are generally associated with alfalfa grown on the better soils. Alfalfa does not protect erosion-prone soils as well as pasture grasses and on these soils orchardgrass or timothy should be grown with the alfalfa. We suggest that you choose your new alfalfa fields well in advance of seeding so you can program soil fertility and weed control practices which favor alfalfa. If possible, avoid seeding alfalfa on fields following alfalfa. Recent research in Virginia and Illinois shows that annual yields are reduced by one ton of hay per acre when alfalfa following alfalfa was compared to alfalfa following corn in a crop rotation.

### Soil Fertility

For high yields and persistent alfalfa crops we must eliminate potential problems related to soil fertility. Many alfalfa stands fail because the soil is too acid (below pH 6.2). Several months are needed for agricultural limestone to reduce soil acidity to a safe level. Therefore, it is essential that soils be sampled for testing well in advance of seeding so that limestone can be applied early enough to adjust soil acidity by seeding time. Because of its high yield, alfalfa extracts and requires more soil nutrients, especially phosphorus and potassium, than other forage crops. To avoid damage to the field surface and to young alfalfa plants, fertilizers should be applied before seeding, at rates determined from soil tests, according to anticipated levels of production (see AGR-1, Lime and Fertilizer Recommendations). Alfalfa establishment, productivity, and longevity in Kentucky may also be limited in some areas of boron, molybdenum, and sulfur. Research continues on molybdenum and sulfur effects. Currently, we recommend that alfalfa seedings receive 1.5 to 2 lb boron/acre/year. If alfalfa is seeded into soils where pH is below 6.2 or where it has not stabilized after liming, we recommend that sodium molybdate be broadcast at 1 lb/acre at

seeding. Agricultural limestone can also be drilled with the inoculated seed as a temporary measure. Fertilizers should never be mixed with inoculated, raw seed. Fertilizers may be less toxic to inoculum on coated seed.

### Variety

Adapted alfalfa varieties marketed in Kentucky have remarkably similar performances when evaluated in the Kentucky Forage Variety Trials. Choose a variety which performed well in tests at the location nearest to your farm. Look for high yields and characteristics which favor its persistence in your location (i.e., select a variety which is resistant to phytophthora and bacterial wilt for fields with slowly drained soils or wet spots).

### Inoculation

Inoculation is recommended for every seeding of alfalfa because poor nodulation is still a primary cause of low yields and shortlived stands (see AGR-90, Inoculation of Forage Legumes). New inoculants may also contain more effective strains of the nitrogen-fixing Rhizobium bacteria. Inoculants should be applied immediately before seeding and the inoculated seed should not be exposed to bright sunlight. Stickers should be used to make sure bacteria stick to the seed. Mixing alfalfa seed and dry peat-based inoculum in the seed box does not give effective nodulation. Do not mix inoculated seed with fertilizer for it may remove bacteria from the seed coat, or kill many of them and reduce nodulation. Make sure the inoculant that you buy is recently prepared and is specifically labeled for use with alfalfa. If, for any reason, alfalfa fails to nodulate and seedlings are pale and spindly, nodulation may be achieved by broadcasting inoculum over the stand at night when soils are wet. This may be accomplished by inoculating and broadcasting dry sand or by suspending inoculum in water and spraying on the stand at the rate of 20-40 gallons of water per acre.

### Coated Seed

Coated seed is a convenient, commercially prepared package of seed, inoculum, and coating materials. Coating of alfalfa seed makes seeding a little easier and it may improve establishment in less than perfect conditions. Research on coated seed at the University of Kentucky indicates that better seed distribution is possible with coated seeds, that plants derived from coated seeds may be larger and more vigorous, and that coated seeds have an advantage when alfalfa is broadcast or is seeded when soil moisture is limiting. Lime and other materials make up about one-third of the weight of coated seed and the closeness of the lime to the seed assists nodulation and seeding establishment in more acid soils.

### Seeding Rates

Good stands of alfalfa may be achieved when 10 to 12 lb/acre of high quality seed are drilled in a well-consolidated (firm) seedbed. Alfalfa which is seeded into a poorly prepared seedbed, or is seeded by a machine which does not achieve close contact between the seed and the soil or does not cover the seed, should be sown at 15 lb/acre according to Virginia research. Higher seeding rates will not adequately compensate for poor conditions during establishment.

### Seeding

Alfalfa may be seeded from mid-April until the middle of September in Kentucky but you can usually expect better establishment in spring (about mid-March through mid-April) or in fall (mid-August through mid-September). No-till seedings should be made later in spring because of soil moisture conservation and lower soil temperatures where soil is not disturbed. Spring-seeded alfalfa can use soil-stored moisture but fall seedings are dependent on rains which are usually variable in both frequency and amount. Weeds are likely to be more of a problem in spring-seedings and chemical weed control is essential. Fall seedings may also face greater stand losses through winterkill and sclerotinia crown and stem rots. Overall, spring seedings of alfalfa are likely to be more successful than fall seedings.

Where erosion is a serious problem, we recommend seeding 4 to 6 lb of orchardgrass or timothy per acre with alfalfa. Seeding of alfalfa into small grains is not considered to be the best method of establishment, but it can be successful if small grain stands are "thin" and small grains are removed early by grazing, green chop, or for silage.

Seeds require close contact with the soil so water can enter the seed and initiate germination as rapidly as possible. Drilling at one-inch depth or less into a firm-well-consolidated seedbed is preferred, whether conventional or no-tilled. Covering of seed and consolidation after seeding are also likely to improve the rate of establishment.

A common problem encountered in fall seedings is germination of seed following a light thundershower, followed by a long rain-free period during which seedlings dessicate and die. This can be avoided by preparing the seedbed and waiting for one inch or more rain. Wait for the soil surface to dry and then seed. If the date for most successful establishment has passed before sufficient rainfall occurs, seed about one bushel of wheat and any desired grass in the fall. Wait and seed alfalfa into wheat the following spring.

### Conventional vs. No-till Seedings

Conventional seedbed preparation for alfalfa involves cultivation to destroy the existing crop or its residues. Chemicals (Eptam or Balan) may be incorporated into the soil for weed control during establishment (see AGR-6, Chemical Control of Weeds in Farm Crops in Kentucky 1983). Incorporation of these herbicides into the soil creates a seedbed which is loose and unsatisfactory for seeding. Further consolidation of the seedbed must be accomplished by some method, such as cultipacking, to provide a firm seedbed for the small alfalfa seed. Correct placement of alfalfa seed is difficult in poorly consolidated seedbeds. Loose seedbeds give variable germination and seedling development and often result in rough surfaces which make mowing difficult. After cultipacking, the seed may be drilled into the soil to about a one inch depth or they may be broadcast on the surface and cultipacked a second time. Use of a cultipacker-seeder can often accomplish all of this in a once-over operation.

Alfalfa may be successfully introduced into the grass sods by using the disk-harrow to disturb about 80% of a closely grazed sod which has been previously fertilized and limed. Details on preparation of the field and seeding can be obtained from AGR-26, Renovation of Grass Fields.

No-till seedings of alfalfa are an acceptable alternative to conventional seedings in Kentucky. Many of the advantages which make no-till cropping successful in this state apply to no-till alfalfa. Compared with conventional seeding practices, no-till may reduce establishment costs, make seeding less weather dependent, and conserve soil moisture. With no-till seedings, it is extremely important to obtain complete control of the existing vegetation. This can be accomplished by the use of 2,4-D to control any broadleaved weeds followed by a spraying of Paraquat or Glyphosate to either kill or severely burn back the existing vegetation prior to seeding. New herbicides will soon be available to kill grasses in established stands and these chemicals will likely increase the area of alfalfa established by no-till techniques. It is usually necessary to use one of the no-till pasture seeding machines in order to obtain proper placement of seed in the soil.

### Harvest Management

It is extremely important that seedling alfalfa plants have from 70-90 days for establishment prior to the first cutting. The actual number of days will vary with the temperature, soil moisture, competition, and other factors which influence plant growth rate. Stands seeded in the spring prior to April 15 should usually be cut for the first time about July 1. Stands which are seeded in the fall may obtain sufficient growth to be harvested after temperatures have dropped to approximately 23°F. Usually no fall harvest will be made other than this freeze-down

harvest of a newly seeded fall stand. (Details on correct harvest management will be provided by Mr. Harold Vaught this afternoon.)

### Pest Control

Quite frequently, new stands of alfalfa are obtained and then very shortly lost either to insects, diseases or weeds. It is extremely important that new seedlings be examined frequently and carefully to determine the extent of damage from pests and the need for control measures. These pests will all be discussed later in the program.