



PRODUCING RED CLOVER SEED IN KENTUCKY

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Kentucky farmers sow an estimated 1 to 2 million pounds of red clover seed annually. Some is sown in rotations with corn or tobacco, followed by small grains, but an increasing percentage is used in pasture renovation. Seed production in Kentucky traditionally has been a by-product of forage production, and seed may be harvested only if forage is not needed for livestock feeding. Production of seed of red clover in the eastern United States has declined the last 20 years, and Kentucky is no exception to this trend. At its peak, about 10,000 acres of seed were harvested annually in Kentucky; now it has declined to 2,000 acres or less. Most red clover seed sown in Kentucky is imported from other states, notably the Pacific Northwest where seed yields are higher than in Kentucky. Unfavorable climatic conditions limit red clover yields in Kentucky, but yields could be increased by following improved management techniques outlined in this leaflet.

Varieties

If you wish to produce seeds for your own use, start with certified seed of a good variety. For seed you wish to market commercially, see the "Seed Certification" section of this publication. Several very good red clover varieties are available to Kentucky growers. These include Kenland and Kenstar, released by the Kentucky Agricultural Experiment Station, and several proprietary varieties released and sold by commercial seed companies. Regardless of variety used, it is a good practice to purchase and sow foundation or certified seed. Much of the seed sold in Kentucky traces to Kenland or Kenstar but, if uncertified, must be labeled as common seed. In tests at the University of Kentucky, such common lots range from 10 percent to 90 percent of the best variety in yield trials. See the most recent year's Kentucky progress report "Kentucky Red Clover Variety Trials." Also see the latest version of "Growing Red Clover in Kentucky" (under revision).

Stand Establishment

Good soil and adequate fertility are necessary for growing good seed crops of red clover. Certain easy-to-follow practices are necessary, however, to get maximum stand establishment for this crop.

Fertilization—Well-drained soils with a pH range of about 6.1 to 6.7 are best for establishing red clover. Soils known to have low productivity should be limed and fertilized at least six months prior to seeding. Sometimes seed yields can be increased by top dressing the field in early spring of the second year or immediately after the hay crop has been harvested. A soil test is always helpful in deciding whether liming or fertilization should be done. (See Kentucky Extension publication AGR-1 for detailed recommendations on the amounts of fertilizer and lime to add at different fertility levels.)

Planting Procedures—Red clover in Kentucky is usually sown in small grain on a honeycomb freeze from mid-February through March. A light disking or rotary hoeing prior to or immediately after seeding provides a light cover of soil and lessens the likelihood of seed movement during heavy rains. Seed may be sown with a grain drill equipped with a small seed attachment or by use of a cyclone-type seeder. Since small grain is commonly used as a cover crop, care should be taken to prevent dense small grain stands at the time of clover seeding. Small grain seeding rates should not be more than 3/4 bushel per acre for wheat, barley, or rye and 1-1/2 bushels per acre for oats. If a heavy spring growth of small grain occurs, however, it should be grazed or clipped to give the young clover plants a better chance to survive.

Red clover may also be sown on a prepared seedbed in late summer from about August 15 in northern Kentucky to September 1 in southern Kentucky. Higher seed yields may be expected in the following two years from fall sowing than from spring sowing. Generally, summer seedings are more likely to fail than are spring seedings because of drought and crownrot injury.

Seeding Rates and Mixtures—As little as 3 pounds of red clover seed sown per acre has produced high seed yields. It is desirable, however, to sow 8 to 10 pounds per acre on most farms to ensure good stands. Seed should be inoculated with an appropriate commercial inoculum prior to seeding. Grasses sown with red clover may reduce seed yields of the clover by reducing the clover stand and the number of heads per plant. This reduction may be more pronounced in late summer seedings. Consequently, where erosion is not a problem, clover planted for seed should be sown without a companion grass or the grass should be sown at a low rate. Orchardgrass is a more serious competitor in respect to clover seed yields than is timothy, Kentucky bluegrass, or Kentucky 31 tall fescue.

Plant Spacing—Although the highest yields of red clover seed may be obtained from fields that are broadcast or sown in rows 6 inches apart, more seed per pound of seed sown may be produced by sowing in rows 12 inches or more apart. When using these wider rows, the seeding rate may be as little as 2 pounds per acre. Weeds are likely to be a problem in row-seeded red clover; thus, this method cannot be generally recommended for Kentucky unless seed is scarce.

Producing a Seed Crop

Although it is possible to produce seed of red clover in the first year after spring planting, this is *not recommended* because the yield is likely to be low and because undesirable annual types of red clover plants are more likely to flower at that time. Certification regulations permit the development of only two seed crops on a given stand of red clover, even if only one of the crops is harvested for seed. These two seed crops should be harvested in the second and third years after establishment under Kentucky conditions (counting the year of sowing as the first year).

Management—Often stands of red clover are lost by improper management during the first year. If the first year's growth of clover is heavy, it should be removed by September 1. *Except after freezedown, the stand should not be cut or grazed after September 15 in northern Kentucky or after September 25 in southern Kentucky.* Later cuttings prior to freezedown will likely result in much winter killing of clover plants. Grazing or harvesting after freezedown is desirable if the growth is heavy.

Management of the first crop (for hay) of red clover in the year following the year of seeding is extremely critical in its effect on the yield of seed produced. *The crop should be cut for hay no later than 10 to 15 days after the first blooms appear in the field.* Almost without exception, red clover in Kentucky is cut for hay much too late. Consequently, not only is the hay of poor quality, but seed yields that follow are much lower than they need be. Late cutting of the hay crop also can weaken the stand so that little or no seed is produced the following year.

Insect Pollination—Insect pollination of red clover flowers is essential for producing seed. Bumblebees do practically all of the pollinating in Kentucky and, for that reason, the number of bumblebees working in a seed field directly affects the seed yield from that field. Proper care should be taken to prevent nesting sites of bumblebees from being molested or destroyed. Chemicals to control harmful insects should be used with caution to avoid reducing the number of bumblebees. Setting two or more hives of honey bees per acre near or in the field might increase seed yields, particularly if no other crop that would be more attractive to honey bees is in flower at the same time.

Weed Control—Curly dock, buckhorn plantain, dodder, and other weeds might be present in red clover fields. These weed seeds cannot be easily removed from clover seed without special seed cleaning equipment. Consequently, when the clover acreage is small and the number of weed plants few, the most feasible way to destroy them might be to rogue them from the field sometime prior to harvest. Where this job is too large, some control can be acquired by spraying with recommended herbicides. Consult Kentucky Extension publication AGR-148, "Weed Control in Alfalfa and Other Forage Legume Crops," regarding the rate, formulation, and various times of application for herbicide use.

Dodder grows as a parasite on red clover and usually occurs in spots within a seed field. The clover in these spots may be cut with a sickle and removed from the field or destroyed with a burner, preferably one using propane or butane fuel. Fields known to have heavy infestations of dodder, buckhorn plantain, curly dock, giant foxtail, or other troublesome weeds should probably not be used in producing a red clover seed crop. If a red clover field becomes heavily contaminated with these weeds, it is advisable not to harvest it for seed.

Harvesting the Seed Crop—Red clover is ready to harvest for seed when the majority of heads are brown or black. The crop may be combined directly or after windrowing with or without use of a desiccant, such as paraquat. Tests at the University of Kentucky comparing weedy farmer seed fields combined with or without the use of a desiccant indicated no advantage to the use of the desiccant in terms of seed yield or losses of seed through tailings. In tests on the University Farm, seed yields in pounds per acre were as follows: Windrowed, 206; desiccated (combined direct), 326; swathed, 267; and direct combining (no desiccant), 309. Percent yield loss in tailings averaged about 35 percent. These results indicate that adequate seed yields can be produced in Kentucky if the seed heads are dry and the screens and airblasts are set as recommended by the manufacturer. If the material to be combined is excessively weedy, the use of a desiccant may be recommended. On some humid days it might be necessary to limit combine operations to only a few hours in the middle of days with fairly low humidity. Under

many conditions, it might be desirable to harvest as much seed as possible in the “rough.” This must be immediately dried to prevent heating and rethreshed with a stationary combine.

Seed Storage and Processing

Red clover seed may heat in the bin or the bag soon after combining. Consequently, it should be examined frequently until all danger of heating is past. If the seed begins to heat, it should be spread in a thin layer on a dry floor and shoveled or stirred frequently until thoroughly dried. If much green foreign material is present, cleaning with a fanning mill will aid in drying the seed. If drying facilities are available, the seed can be placed in the dryer in either the bag or in bulk and dried with either unheated air or at low temperatures (with over 18 percent moisture: to 90°F; with under 18 percent moisture: to 100°F).

Red clover seed is not sufficiently cleaned as it comes from the combine to be satisfactory for replanting or marketing. Therefore, plans should be made prior to harvest to have the seed cleaned in a well-equipped seed conditioning plant. Many contaminants in red clover seed can be removed on an air-screen separator equipped with proper screens. However, troublesome weeds, such as dodder, buckhorn, curlydock, and giant foxtail, cannot be completely removed with an air-screen separator, and the seed will have to be conditioned on special equipment such as a velvet-roll machine and/or a magnetic-mill separator. If these more troublesome weeds are present in the field, a grower should make certain the conditioner has special equipment before contracting for seed conditioning.

Seed Certification

It is generally economically advantageous to market certified seed of a “named” variety. In Kentucky, certified seed of both Kenland and Kenstar varieties can be produced and marketed following the certification requirements of the Kentucky Seed Improvement Association.

To produce certified seed for these varieties it is necessary to plant foundation seed, which may be purchased from the Foundation Seed Project, Department of Agronomy, University of Kentucky, Lexington, KY 40506. Seed harvested from fields sown with foundation seed is eligible for certification. Some steps that should be followed for producing a certified red clover seed crop are:

1. **Seed Source.** Plant foundation seed on clean land. Only those fields on which no red clover plants of other strains or varieties have grown for the preceding three years will be eligible for producing a certified seed crop.
2. **Isolation.** To avoid the possibility of cross-pollination, a certified seed field must have a minimum isolation distance of 160 feet (for fields of 5 acres or more) from any other variety or strain of red clover. This isolation distance can be accomplished by mowing adjoining fields at the time of bloom to prevent cross-pollination.
3. **Length of Stand.** A stand of red clover will not be eligible to produce certified seed after two seed crops. The seed crops may be produced in either the same year or consecutive years.
4. **Apply for Certification.** An official application for field inspection must be sent to the Kentucky Seed Improvement Association office before July 1 each year so a field inspection can be made.

For additional information on other requirements for producing certified seed, contact your local county Extension agent or write to the Kentucky Seed Improvement Association, P.O. Box 12008, Lexington, KY 40579.

Certified red clover seed production fits well into most cropping rotations presently used by Kentucky farmers. This certified seed can be marketed by the producer himself or under contract, usually at a premium price, to several seed companies in the state.

