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SOYBEANS AND COWPEAS FOR HAY

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The soybean is the best annual hay plant adapted to Kentucky. It is dependable. Few seasons are so unfavorable that it will not make a fair yield of excellent quality hay on any type of soil of moderate productivity. It is, therefore, extremely valuable where soil conditions do not permit growing the clovers or alfalfas, or as an emergency crop in the event of seasonal failure of the regular hay crops. Even in good clover and alfalfa regions, the soybean is extensively used to supplement these crops on farms requiring large amounts of legume roughage.

Planting Time. The planting season for soybeans for hay extends from May 1 to July 1. Generally, the most convenient time to plant the crop is from the middle of May to June 1, or after corn planting is finished and before beginning the harvesting of grain, clover and other hay crops. Soybeans planted during this period give maximum yields and, if medium early varieties are used, the crop will be sufficiently mature to harvest before the busy season of tobacco-housing. When small-grain crops can be removed in June, it is possible to follow with soybeans and obtain very fair yields of hay in favorable seasons.

Varieties. Since little soybean seed is produced in Kentucky, growers must depend largely upon seed produced elsewhere. This limits the choice to the strictly commercial varieties grown both in the Corn Belt and in the South. The southern varieties are late maturing, but are in the proper condition to cut for hay by the middle of September or slightly later, giving ample time to follow with a seeding of small grains.

The most important southern variety is the Mammoth, and this is still grown more extensively in Kentucky than any other sort. In recent years the Mammoth has not given good results in all parts of the State, particularly in the Bluegrass region, but in most sections it yields as much hay as any other variety, or more, especially on poorer types of soil. Unless seeded heavily, Mammoth produces very coarse hay, an objectionable feature in the opinion of many. Other southern varieties similar to Mammoth in most respects are Southern Hollybrook, Tar Heel Black and Biloxi. Laredo, a comparatively new sort, has very small, black seeds and extremely fine stems. It makes hay of excellent quality. The seed commands a high price per bushel, but much less is required per acre—only about half as much as of Mammoth, for example.

Perhaps the most popular medium early variety is Virginia, which seems to give good results everywhere in Kentucky. It has moderately fine stems. Midwest is the next in popularity, and is generally satisfactory. Wilson Black and Ebony are also good. Peking is not always thrifty, especially on land of only medium fertility. Lexington is an excellent hay bean, but little seed is available. Haberlandt is more valuable for hogging down than for hay. Mansoy, a new sort, is good, and the very new Harbinsoy is, in the opinion of many, one of the most promising varieties yet introduced. The very early varieties, chief of which are Manchu and Ito San, give small yields of hay and are generally unsatisfactory in Kentucky.

Land Preparation. In preparing land for soybeans, all trash, especially cornstalks and stubble, should be covered completely. Trash on the surface interferes with drilling and makes it impossible to cultivate effectively. Broadcast cultivation is of great value in keeping down weeds. A good, level seed-bed should be prepared. It is an excellent plan to drag land before drilling.

Inoculation. Inoculation is very important in getting good results with soybeans. When the field has not grown the crop previously, artificial inoculation is necessary. It is not always easy to get good inoculation with soybeans. The

safest way is to drill dry, screened, inoculated soil thru the fertilizer attachment of the drill. About 100 pounds of seed per acre is required. Sifting dry, inoculated soil over moistened seed at the rate of a peck or more to each bushel of seed is also effective. Commercial cultures are, of course, most convenient, but do not always give a good setting of nodules, altho generally effective.

Seeding. Thick seeding of soybeans is advantageous. It pays to seed soybeans liberally, as a thick stand checks weed growth and gives hay of better quality than a thin stand. Two bushels per acre, if seeds are large, as those of Mammoth; a bushel and a half, if seeds are of medium size, such as those of Virginia, Midwest or Lexington; or one bushel, if seeds are very small, are desirable rates of seeding. The grain drill is the best implement for sowing soybeans. The oats runs should be used for all except varieties with very small seeds, such as Laredo and Peking. For these, it is necessary to use the wheat runs. The rate at which the drill delivers the seed is influenced by the size of the seed, and to obtain the proper setting for accurate sowing of any particular lot of beans, the drill must be tested or calibrated. This can be done as follows: When oats runs are used, use the oats scale in making a tentative setting, or the wheat scale when the wheat runs are used. Weigh the seed before putting it into the drill and sow an acre of land as shown by the indicator. If the drill lacks an indicator, step off an acre (seventy yards square). Weigh the seed left in the drill to determine how much was sown. The setting can then be adjusted so the drill will sow approximately the desired amount of seed. The amount of seed a drill delivers may also be estimated with a fair degree of accuracy by counting the number of seeds sown to the foot of drill row. Of course, to make a count, the seed must be drilled on the surface of the ground. About two bushels an acre of Mammoth, Haberlandt, and other large-seeded varieties will be sown when the seeds are spaced an average of about three inches apart. A spacing of about two inches will give a rate of seeding of a bushel and a half an acre or nearly this amount in case of Virginia, Midwest and Wilson. A rate of one bushel an acre gives a

spacing of about two inches in the drill with Laredo, Peking, Sooty or Wilson 5. In sowing soybeans, the drill should run just deep enough to place the seed in moist soil. It is better that a few seeds escape covering rather than to cover all very deeply. Deep drilling followed by a heavy rain which crusts the soil usually results in a poor stand.

Cultivation. Harrowing soybeans when the plants are up well is a common practice among experienced growers. When the seed-bed is prepared as recommended, the plants will be little injured by harrowing, and the crop will be much cleaner. A weeder is satisfactory if the soil is not crusted. The rotary hoe is said to be as effective as the harrow, or more so on crusted land, and destroys fewer plants.

Stage for Harvesting. Soybeans should be cut for hay when the seeds are still very small. Earlier cutting gives good hay but smaller yields. Cutting after the seeds have become well developed gives larger yields but a poor quality of hay. It is also more difficult to cure. After the leaves begin to turn yellow, the hay produced is very inferior in quality—little better than soybean straw.

CURING SOYBEAN HAY

Where a good-sized acreage is grown, probably the most practical method of curing the hay is a combination of swath and windrow curing. The cutting bar of the mower should be tilted to cut as high as possible. A high stubble holds the hay off the ground and prevents its becoming very dusty. The beans should be tedded, if possible, before the leaves become dry enough to crumble. After curing in the swath for about two days, the hay should be raked into small windrows, using a side delivery rake where available. The raking should be done in early morning to prevent shattering and loss of leaves. Three to four days in the windrow will complete the curing, if the weather is favorable. Soybean hay should not be put into the barn or stack when the leaves are "in case"; that is, have taken up enough moisture to be limp.

If rain occurs before curing is completed, the windrows should be turned as soon as the outside hay is dry. If this is

not done, the wet leaves mat together and rot quickly.

Some growers cure soybeans entirely in the swath. The hay bleaches badly, but its palatability and nutritive qualities are apparently not greatly reduced. Rain on soybeans in the swath does less damage than to clover or alfalfa. Partial windrow curing prevents excessive bleaching, and the hay does not become so dusy in case of rain. The necessity of turning the windrows after wetting is a disadvantage.

Many farmers feel that the finer quality soybean hay produced by shock curing more than justifies the heavier cost, and this method is usually advocated by experiment station investigators.

In the South, curing frames are used extensively for both soybeans and cowpeas. A very fine quality of hay is produced by the use of frames at a cost not much greater than that of the usual method of curing in shocks. For the farmer who has only a small acreage of soybeans, the use of curing frames is entirely practical. For the extensive grower, it is a question of labor supply and hay values. In shock curing, soybeans should be left in the swath from twenty-four to forty-eight hours, depending upon the weather, but should be raked before the leaves are dry enough to crumble. The hay should be shocked in tall, narrow shocks, carefully built. If frames are used, the shock should be built over the frame. Soybeans pack down closely if shocked when only slightly cured, and the leaves mat together so that moderate rains penetrate the shock but little. Where frames are used, it is rarely necessary to tear down the shocks for drying, even after heavy rains. Eight to ten days will usually complete the curing.

COWPEA HAY.

The methods followed in growing and handling cowpeas for hay are practically the same as those used with soybeans. Cowpeas should not be planted until the weather is warm, as they are greatly injured by periods of cool, damp weather. They are not usually cultivated, because the young plants are rather tender. Cultivation is not so necessary as for soybeans, because cowpea choke out weeds much more effec-

tively than soybeans. The peas should be cut for hay when some of the pods have ripened. Shock curing is almost essential for obtaining hay of good quality, as the hay is badly damaged by rain and the leaves drop off easily. The crop is much more difficult to cure than soybeans. The most desirable hay varieties are Whippoorwill, Groit, New Era and Brabham. A bushel to a bushel and a half per acre is the customary rate of seeding.

Fertilizers for Soybeans and Cowpeas. One hundred and fifty to two hundred pounds of superphosphate per acre may be considered the most practical fertilization for soybeans wherever soils are deficient in phosphorus. It may be safely drilled in with the seed. Practically all the soils of the State are deficient in phosphorus except the better Bluegrass soils. Liming acid soils greatly increases yields of soybeans.

In fertilizer tests on the various soil types of the State outside the Bluegrass region, superphosphate increased the yields of hay an average of about 600 pounds per acre, while limestone and superphosphate increased the yields an average of about 1500 pounds per acre.