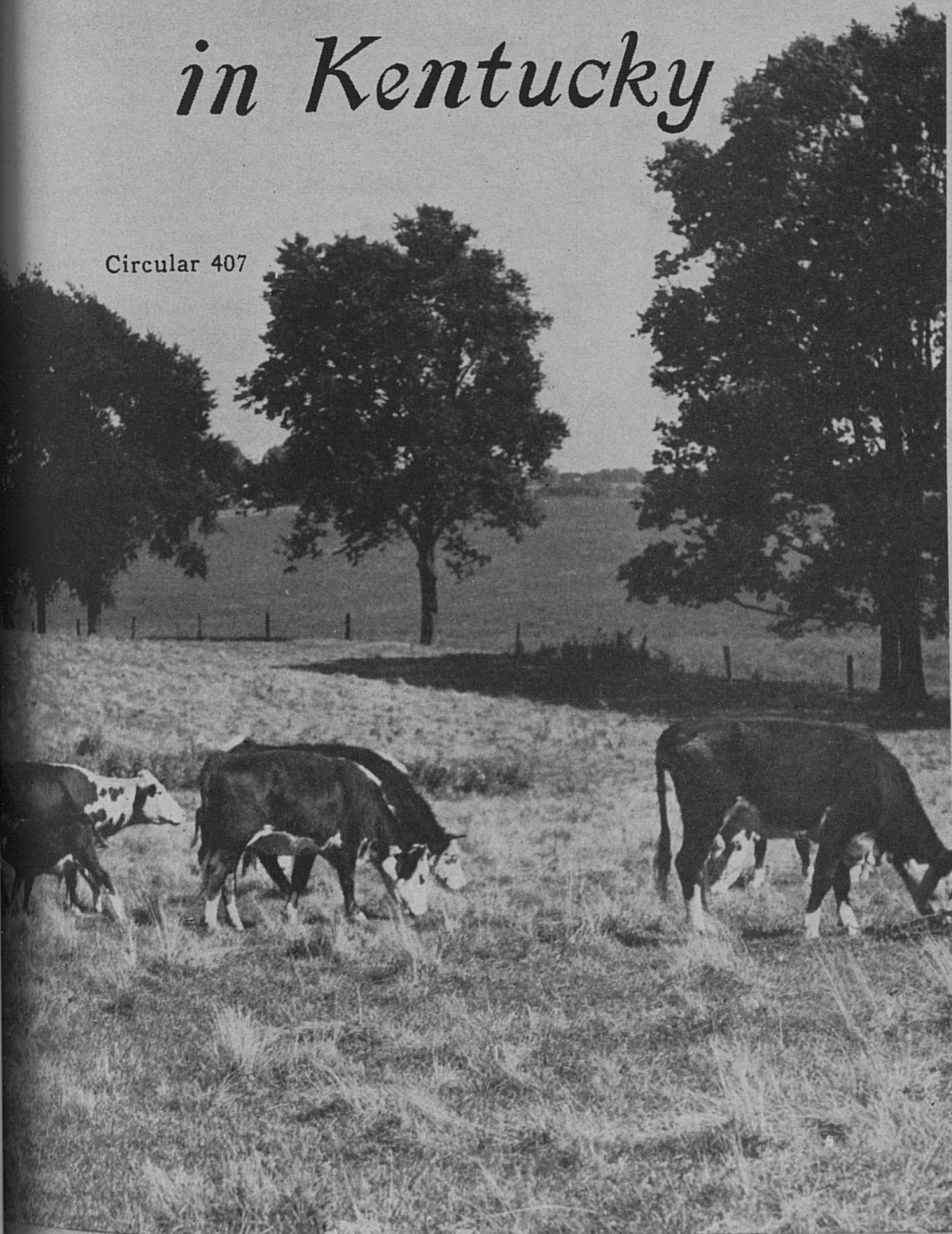


LESPEDeza

in Kentucky

Circular 407



UNIVERSITY OF KENTUCKY: College of Agriculture and Home Economics
Agricultural Extension Division . . . Thomas P. Cooper, Dean and Director

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A field of lespedeza for hay.

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(This circular is a revision of Circular 297.)

Lespedeza in Kentucky

By E. J. KINNEY, RALPH KENNEY, and E. N. FERGUS

Lespedeza, chiefly Korean, alone or with grasses, was grown on about 8 million acres in Kentucky in 1944—at least four times the total acreage of all other legumes. Most of this large acreage has been developed during the past 10 years. As acreage of other legumes has not fallen off, the 8 million acres of lespedeza are a net gain in the legume acreage of the state.

Lespedeza is popular for several reasons. It meets the need for a pasture legume, especially on the poorer soils; it provides a valuable hay crop; it seldom fails to make a stand; and it seeds abundantly. It can be grown with some success on almost any soil, even a much-depleted soil. This last feature, however, is not so great an advantage in the long run as might seem at first thought. For a few years lespedeza may give fair returns, and crops following it may yield better than formerly because of the nitrogen added to the soil by the legume crop. In time, however, the soil will become too exhausted even for lespedeza, if the crop is removed and no manure or fertilizer is returned. This should be understood and every effort should be made to supply the needed soil-improving materials before such a stage is reached.

SPECIES AND VARIETIES

The lespedezas of most importance in Kentucky are of three distinct species, "Common lespedeza" generally known as Japan clover, Korean lespedeza, and the perennial *Lespedeza sericea*. Tennessee 76 and Kobe are giant varieties of Common, and Harbin is a dwarf variety of Korean.

Common lespedeza has been abundant on wasteland, old pastures, and roadsides in most parts of the state for 50 years or more. Kentucky farmers were slow to recognize its value, however, and it was not until about 25 years ago that much of it was sown. Interest then developed, and soon it ranked as one of the most important legumes.

As a species, common lespedeza is not uniform, but consists of numerous strains which differ much in time required to produce seed and to a less extent in size of plants and habits of growth. The later strains ripen seed only in the South, but the earliest ripen early enough to reproduce the stand as far north as central Ohio, Indiana, and Illinois. Common lespedeza is an excellent pasture legume and on productive soil often grows large enough to cut for hay. It is not so generally useful as Korean, however, and as soon as seed of the latter became plentiful practically all farmers stopped sowing the common.

Tennessee 76, developed from common lespedeza at the Tennessee Agricultural Experiment Station, grows much taller and more erect than common, but otherwise appears much the same. It is as desirable for pasture as common, and better for hay because it grows larger. Apparently it produces less seed than common or Kobe, the other variety of common, and is later in maturing. Not much of it is grown in Kentucky. Seed of Tennessee 76 cannot be distinguished from seed of common lespedeza.

Kobe lespedeza is not easily distinguished from Tennessee 76 during growth, especially in a thick stand. In a thin stand Kobe, like the common, has a more spreading habit of growth than Tennessee 76, the plants are somewhat coarser, and the leaflets broader. It ripens seed earlier and, according to growers who have grown seed of both commercially, is more productive of seed. The seeds of Kobe are much larger than those of common or of Tennessee 76 and can easily be distinguished. Because of the larger size of the seeds a heavier rate of seeding of Kobe is necessary than of other varieties in order to get an equally thick stand.

Korean lespedeza differs from the varieties of common in many respects, and is easily distinguished from them. It grows about as large as Kobe, and the tips of the growing stems are more compact and distinctly different in appearance. In a very thin stand, the stems spread out and a single vigorous plant may form a cluster 2 feet or more across. In a thick stand, however, few branches form and the plants grow erect. Seeding habits also differ from those of the common species and it is far more productive of seed. Korean lespedeza seed germinates in less time than seed of the common, and consequently the plants appear earlier in the spring. Its early growth is much more rapid than that of other varieties; hence it furnishes somewhat earlier grazing. The seed ripens about three weeks earlier than seed of common or Kobe. All varieties of common drop their leaves when killed by frost, but the leaves of Korean are retained most of the winter.

Harbin lespedeza matures much earlier than Korean and the plants are much smaller. It is not a valuable legume in Kentucky.

Lespedeza sericea is a true perennial form. How long a stand will last doubtless depends much upon the way the crop is used. A stand harvested for seed each year has been known to last as long as 10 years, but it is doubtful whether stands cut for hay or pastured will last that long.

Though *sericea* has been available to Kentucky farmers for a number of years, few have adopted it. In competition with annual lespedeza and other legumes it has failed so far to make an important place for itself. It is not entirely winter hardy in Kentucky, yet it seldom winterkills badly. It begins growth much later in the spring

than alfalfa, the first shoots appearing about the latter part of April in the vicinity of Lexington. At that time alfalfa may be a foot high. Growth is very rapid, however, and it may be ready to cut for hay almost as early as alfalfa. The stems of sericea are rather coarse, especially in a thin stand, and they become hard and woody with age. To make palatable hay the crop must be cut at an early stage. The plants are very leafy and carefully cured hay carries a high proportion of leaves. As a pasture crop, reports are conflicting as to the value of sericea, though it has a high carrying capacity. Whether or not it will long withstand close grazing, has not been determined.

At the Kentucky Experiment Station considerable difficulty has been experienced in getting a good stand of sericea in broadcast seedings with small grain. After the plants are up, they seem to be very drouth resistant, and are able to compete remarkably well with weeds.

WHAT VARIETIES TO CHOOSE

All but a small fraction of the lespedeza grown in Kentucky is Korean, undoubtedly the most generally useful variety for this state. While it does not differ much from other kinds of lespedeza in adaptation to soil and other conditions, it produces far more seed than any other variety, with the possible exception of sericea. The importance of good seeding habits in a forage crop can scarcely be over-emphasized. It assures plenty of seed at a relatively low price. Korean lespedeza is not only a heavy producer of seed, but it is also dependable. Except in rare instances the seed ripens in all parts of the state early enough to escape early frost (which is not true of other varieties), and even in very dry years fair yields are obtained where soil conditions are favorable. The seed crop can be harvested more readily by machinery than that of other varieties, with less loss by shattering. It also ripens early enough to permit seeding small grain in the stubble.

Another reason for the popularity of Korean lespedeza with farmers is the ability of the seedlings to grow with nurse crops and other crops. Consequently it is a good practice to include a few pounds of Korean seed in pasture and hay mixtures.

There are possibly some conditions where Kobe, Tennessee 76 or even common lespedeza may prove more desirable than Korean. In experiments with comparable stands, Kobe, Tennessee 76, and Korean have given about the same average yields of hay. The total pasturage furnished also is probably about the same. Korean furnishes earlier grazing. The other varieties remain palatable later in the fall, but this is not of great importance where mixtures of grass and lespedeza are used, for the grass revives in the fall and provides late grazing. Korean lespedeza makes fair grazing even after the plants are killed by frost, because the leaves stay on. It would seem, therefore, that seeding costs, dependability in producing good stands, and how well the crop reseeds itself should be the deciding factors in choosing a

variety. Some experiments indicate that Korean is less tolerant of soil acidity than Kobe and other varieties and not so well adapted to worn land, but here again results are conflicting. It is an easy matter for any farmer to determine by actual test what variety or varieties best meet his requirements, and such a test is well worth making.

LESPEDEZA FOR PASTURE

Use of lespedeza in Kentucky has greatly simplified the problem of establishing and maintaining good pastures. Pastures composed of grasses alone soon become unproductive even on fertile soil, probably because nitrogen becomes locked up in unavailable forms. When legumes are grown in connection with grasses, they supply the nitrogen needed by the grasses. They also increase the total amount of pasturage, because they continue growth when weather is too hot and dry for the growth of grass. This is particularly true of lespedeza, which is a hot-weather crop and most vigorous in midsummer when grasses are naturally dormant. Not only does a grass-legume mixture give the most pasturage but it is also an excellent soil-building combination. A cheap and effective way to improve a worn field is to add the needed minerals (usually lime and phosphate), sow to a mixture of lespedeza and grasses, and keep it in pasture for several years. Much land in Kentucky is so unproductive that cultivated crops cannot be grown profitably on it. Such land, sown in lespedeza, provides considerable pasture and may increase in fertility. Thin bluegrass pastures in the outer bluegrass region, containing little or no lespedeza, give almost twice as much grazing when lespedeza is seeded in them.

It is seldom advisable to sow lespedeza alone for pasture because of its short pasture season. Korean is ready to graze 2 or 3 weeks earlier than other varieties, but it gives little pasturage before the latter part of May or first of June, in the vicinity of Lexington. The plants are killed by the first heavy frost of fall. Grasses, on the other hand, furnish the most grazing in spring and fall, so that the two crops go well together. Also, grasses make a turf which resists erosion and reduces the leaching of nitrogen during the winter.

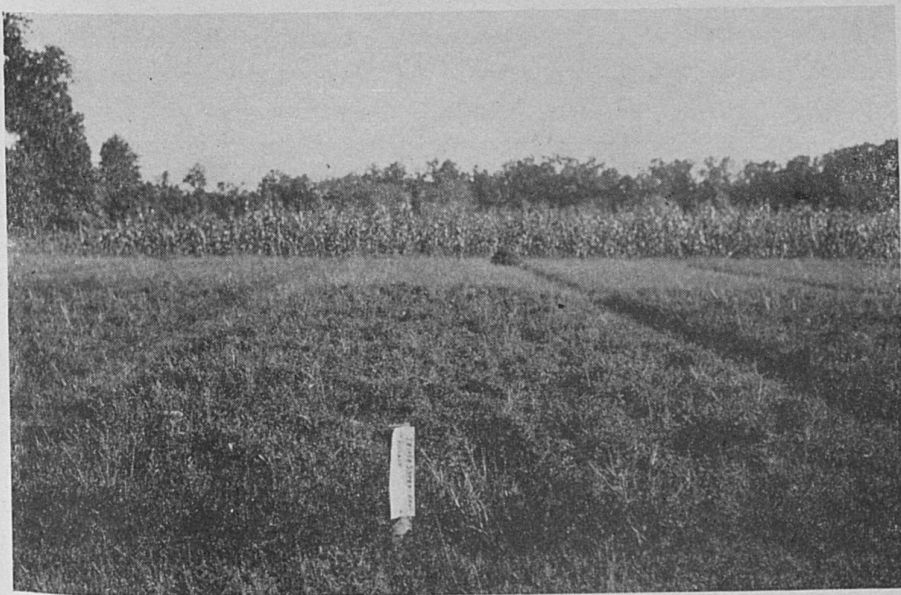
Since lespedeza reseeds itself in pastures, even when closely grazed, it may last as long as the grasses. A very thick stand of bluegrass may crowd out lespedeza or other legumes if grazed very lightly. Also, if lespedeza is permitted to make a heavy growth during the summer, it may kill some of the bluegrass. Grazing may be so regulated, however, that neither the grass nor lespedeza suffers from competition on good soil. There is little or no danger of bunch grasses, particularly orchard grass, crowding out lespedeza, nor will lespedeza smother out such grasses after they become established. There is some danger,

however, that a very thick stand of lespedeza may kill young grass; consequently it is not advisable to seed the lespedeza too heavily when establishing mixed pasture. If the grass is seeded the previous fall, it withstands the competition of the lespedeza better the first year. Fairly close grazing also tends to prevent the lespedeza from injuring the young grass. On the Experiment Station farm at Lexington lespedeza and orchard grass in a 25-acre pasture remained productive and in about the same proportion, for 12 years. On another field, a mixture of timothy, red clover, and Korean lespedeza was cut for hay every year for 4 years. The stand of timothy was very thick, but considerable lespedeza survived, indicating its ability to withstand severe competition.

LESPEDEZA FOR HAY

Soil Requirements

For good yields of hay, lespedeza requires fairly good soil. However, fair yields may be obtained on less productive soil by using phosphate fertilizers, and very good yields from the use of both lime and phosphate. On limestone soil at the Western Kentucky Substation, an average of 1,285 pounds of hay was produced annually in a corn, wheat, lespedeza rotation during a 12-year period, without liming or fertilizing. Applying 250 pounds of 20-percent superphosphate per acre on the corn and wheat crops increased the yield of lespedeza hay to 2,406 pounds per acre. Land that received 4 tons of limestone during the period, in addition to the superphosphate, produced an average yield of 3,634 pounds of hay per acre. Fertile bottomland is



Effect of liming on lespedeza. The part in the foreground was limed; that at the back, next to the corn, was not.

especially desirable for growing hay since it is less affected than upland by summer drouth.

Under favorable conditions thick stands of lespedeza produce remarkable yields of hay. It is estimated that where the stand is good, a yield of a ton per acre may be expected when the height of the plants is 8 or 9 inches; two tons when 12 to 14 inches, and 4 tons when 2 feet high.

Feeding quality of lespedeza hay also is affected by soil fertility. Lespedeza grown on highly productive soil is definitely richer in nutrients than that produced on soils of low fertility.

Controlling Weeds in Hay

Weeds seldom give trouble the first year when lespedeza is seeded in small grain and, if moisture conditions are favorable, a good crop of clean hay may be obtained. In volunteer stands, however, or where the lespedeza is seeded alone, considerable weed growth often occurs. This does not ordinarily reduce the yield, but of course weedy hay is not desirable. Weeds can be controlled rather effectively by clipping the field once or twice during the season. The first clipping is usually done while the lespedeza is small—say about the middle of June. A second clipping, if necessary, may be made later. However, if the weeds are not very numerous, a second clipping is not advisable. *It is highly important to avoid cutting off the tops of the lespedeza plants in clipping*, since that greatly reduces the yield of hay or seed. If necessary in order to avoid cutting off the tops, a weedwheel should be used on the mower.

When to Cut for Hay

The best quality of hay is produced when lespedeza is cut in full bloom. Cutting when the seed is partly formed gives a somewhat larger yield, but the hay is less palatable and less nutritious. It is advisable to cut lespedeza even before it blooms if much lodging occurs, for when the plants lodge the lower leaves "scald" and drop off, thus reducing the value of the hay. Scalding also tends to prevent the formation of new shoots after the hay crop is harvested. Korean lespedeza cut 4 or 5 inches high at the blooming stage or earlier, usually produces new branches from the stems, which mature enough seed for reseeding. This is one decided advantage of Korean for hay. A crop which has not lodged will reseed itself in western Kentucky if cut in very early September.

Korean lespedeza produces its first blooms about the middle of August in central Kentucky in normal seasons. If July is very dry, however, blooming is delayed. Kobe blooms about 2 to 3 weeks later; consequently, if the latter is cut in the full-bloom stage, it will not reseed itself. But reseeding itself is not of great importance in growing lespedeza hay, since the cost of seeding is usually not heavy.

Sericea lespedeza should be cut for hay when about 12 to 14 inches high. If left much longer, the stems become woody and unpalatable. A 4- or 5-inch stubble should be left, as the new shoots come from the stem rather than from the crown. The second cutting usually has fine stems and is leafier than the first.

Curing the Hay

Lespedeza cures quicker than any other legume hay, which is one important reason for its popularity. Hay cut in the morning can be stored safely the following day if conditions are favorable for curing. It may even be baled safely the second day, according to the statement of some growers. It is the only legume hay that can be baled from the windrow or swath, with little danger of damage in the bale.

Like all legume hays, the best quality is obtained where most of the curing occurs in the windrow or cock. It scarcely pays to cock lespedeza, however, since it cures so quickly. The hay should be raked before the leaves become dry enough to shatter—usually 5 or 6 hours after cutting. If the hay has become too dry, raking should be delayed until early the following morning, when enough moisture will usually have been absorbed to prevent shattering. *Sericea* should be raked before the leaves dry as they shatter very readily in handling.

Yields

Yields of 500 pounds of cleaned Korean seed per acre are not unusual under favorable conditions in Kentucky, though the average is about 200 pounds an acre. The best yields are usually obtained the second or third year after a field is seeded, but in many instances fair yields of clean seed are obtained the first year. A moderately thick stand produces much more seed than a dense, thick stand, especially if the dense stand has lodged badly, as often happens.

Kobe and common lespedezas produce somewhat lower yields of seed than Korean, and Tennessee 76 apparently produces slightly less than Kobe and common.

Sericea lespedeza blooms late and the seed does not ripen until the middle of October or later; consequently early October frosts reduce the yields greatly. Some extraordinary seed yields of *sericea* have been reported in Kentucky—as much as 800 to 1,000 pounds an acre where the crop was planted in rows and cultivated. Yields from broadcast stands are lower.

The largest average yields of lespedeza seed are obtained on fertile, low-lying land and there is a natural tendency for production to become concentrated in such areas. The production of lespedeza seed or any other farm seed, for that matter, is a job for the specialist rather than for the general farmer, and most commercial seed is grown by experienced men on a scale large enough to justify the pur-

chase of machinery and other equipment necessary for handling the crop most economically and for producing the highest grade of seed.

High-grade common, Kobe, and Tennessee 76 lespedeza seed weighs 28 to 30 pounds per bushel. Korean seed, in the hull, weighs about 45 pounds and sericea lespedeza seed about 34 pounds. Hull-less seed of Korean and sericea weighs 58 to 60 pounds per bushel.

Harvesting the Seed

The small combine harvester is used to harvest perhaps 95 percent of the lespedeza seed in Kentucky. Unquestionably the crop can be harvested more cheaply with the combine than by any other method, and less seed is lost by shattering. If the crop is cut and combined from windrow it should be handled as little as possible to avoid shattering. Generally the practice is to combine the standing crop after it is dead ripe. Very little seed is lost when harvesting in this way.

Common lespedeza seed is harvested by the use of seed pans attached to the cutter bar of the mower. These are made of metal in most instances, although some home-made wooden pans are used. The top of the metal pan is covered with a perforated lid. As the crop is cut, a man following the mower pulls the mowed plants over the pan, and most of the seed shatters off into the pan. When the pan is full, the seed and chaff are scooped into bags and later cleaned. Mowers may be fitted with reels to drag the cut material across the pan and also aid in threshing out the seed. By using such a reel one man can do the harvesting.

Kobe lespedeza and Tennessee 76 are generally harvested like Korean for seed. However, seed pans may also be used when the crop is mowed, in order to save the shattered seed, which may amount to a considerable percentage of the crop. The combine harvester should prove especially valuable for harvesting Kobe and Tennessee 76.

Sericea lespedeza for seed is usually cut with a mower and threshed with a grain separator or a combine used as a stationary thresher. The combine thresher is also used to harvest seed from the standing crop, though because the seed do not mature at the same time the ripest seed shatter easily and the green seed are difficult to loosen from the plant.

The grain separator also may be used to thresh all kinds of lespedeza seed. Small lots of seed for home use can be flailed out without much trouble. Corn shredders may also be used. Sericea lespedeza may be threshed with a clover huller.

Cleaning the Seed

Most of the commercial seed crop is cleaned in plants where modern power-driven cleaners are in use, with experienced operators in charge. These plants do an excellent job of cleaning and, if a considerable amount of seed is to be cleaned, particularly if it contains

dodder, it is best to have the work done by a reliable custom cleaner. Much seed is sold to dealers and seedsmen without cleaning. The buyers estimate the loss and pay accordingly. Naturally, they usually make liberal estimates, and it is therefore more profitable to have the seed cleaned before selling.

A fairly satisfactory job of cleaning can be done on a good hand fanning mill if the proper screens are used. A slotted top screen or "scalper" with perforations just wide enough to let the lespedeza seed pass through removes the larger weed seeds, such as ragweed. The lower screen, or sieve, should have round perforations which permit anything smaller than a lespedeza seed to pass through. This takes out dodder and other small weed seeds. For Korean seed, a bottom screen with round perforations $\frac{1}{16}$ inch in diameter is generally used. Sometimes, however, perforations $\frac{1}{15}$ inch in diameter are necessary to remove dodder. For Kobe, the perforations should be somewhat larger, and for sericea, smaller. Good work cannot be done if the seed is fed onto the screens too rapidly. Furthermore, the lower screen must be cleaned out frequently, as it becomes clogged. It may be necessary to run the seed through the fanning mill several times before the seed is clean enough.

Dodder seed cannot be thoroughly cleaned from lespedeza without also taking out much of the hulled seed. It is very important, therefore, to avoid hulling the seed in threshing. Sericea seed should be hulled and scarified before sowing. If growers cannot do this or have it done, it is best to sell to dealers rather than to sell direct to farmers.

HARD SEEDS

As is true of most legume seeds, lespedeza seeds cannot germinate for some time after ripening because the seed coats are too hard or dense for water to penetrate. If it were not for this period of enforced dormancy, natural reseeding could not occur. The seeds would germinate soon after they fell to the ground and the young plants would winter-kill. There is much variation in the length of time required for the seed coats to soften. A small percentage becomes soft in a few weeks and since Korean seed ripens early, these soft seed may germinate in the fall. By February about 90 percent of the seeds are capable of germinating, according to tests conducted by the Experiment Station Seed Laboratory.

After the dormant stage is past, Korean lespedeza seed germinates very quickly and where the crop has reseeded itself or where seed has been sown early, a short period of warm weather in February or early March—a frequent occurrence in Kentucky—may bring the plants up. Usually these early stands are killed later by freezes or heavy frosts. However, it is seldom that a good stand of Korean lespedeza is not produced by self-seeding. Korean reseeds itself very heavily and enough of the seeds remain hard until well along in the

spring, to give a thick stand. In addition, considerable seed is retained on the old plants throughout the winter and early spring, most of which drops in late March and early April. In many instances the amount is sufficient to give a good stand if all other seed is lost. The seeds of other varieties of lespedeza require more time to germinate and usually the plants do not come up early enough to be injured by frost.

GERMINATION (VIABILITY) OF LESPEDEZA SEED

In tests at the Kentucky Agricultural Experiment Station lespedeza seed stored in a warm, dry place remained usable for several years. Reduction to about 50 percent germination occurred in 2 to 5 years for common, 5 to 6 years for Korean and sericea, and 3 years for Kobe. Korean remained about 80 percent viable for 2 to 4 years.

Time of Seeding

SEEDING PRACTICES

Perhaps a majority of experienced growers in Kentucky prefer to sow Korean lespedeza during the latter part of March or early in April. The stands obtained are usually as good as from earlier seedings and there is little danger of killing frosts after the plants are up. However, many growers think that early seeding is more desirable despite occasional injury from freezing. The stand becomes established earlier and the plants are better able to withstand competition of the nurse crop and weeds or later dry weather. If the seeds become well covered, a few days of warm weather are not so likely to bring about germination as when they are on the surface. In all early seeding, alternate freezing and thawing and rains must be depended upon to cover the seeds since it is seldom possible to stir the ground; hence, a better covering is usually obtained by seeding in early February or even late January, than by seeding in late February or early March. In other words, it would seem to be safer to sow very early or to wait until after the middle of March rather than to sow moderately early. The most certain method of getting seed well covered in early seeding is to sow on a "honeycomb" freeze. It is never advisable to sow on muddy ground. The condition of the seedbed should be taken into consideration in determining whether to sow early or relatively late. On old pastures or on trashy land where the ground cannot be stirred, early seeding is advisable. In sowing with small grain it is perhaps safer to sow late and run over the field with the harrow or rotary hoe or to use a clover-seed drill. However, if the growth of grain is fairly rank, it is not of much advantage to stir the ground. On hard, bare land, the use of a harrow or other implement is always advantageous. In sowing with oats or alone on a prepared seedbed, it is better to sow the seed on the surface and allow rains to do the covering. After the middle of April moisture conditions

are usually less favorable and it becomes increasingly difficult to get a stand. Because of slower germination, early seeding of all other varieties of lespedeza is advisable.

Korean lespedeza seed, if well cleaned, can be sown through the grass-seeding attachment on the grain drill or with a clover-seed drill. Kobe and common, however, do not feed readily through the drill, since the seeds are rather light and fluffy. Rotary hand seeders or wheelbarrow seeders are satisfactory for all varieties.

Rate of Seeding

For maximum yield the first year, 20 to 25 pounds per acre of Korean lespedeza seed should be sown, and about one-third more of Kobe. Good stands are often obtained with much lighter seedings, but the use of the larger amount is generally profitable. Three to 5 pounds per acre or even less will give a stand thick enough to provide a full stand the following year by volunteer seeding even if the first year's crop is pastured. In mixtures with grasses and other legumes, it is not advisable to sow more than 5 pounds per acre or the growth the first year may be so heavy as to injure the young grass. This is not likely to occur, however, if the grasses are fall-sown, as they get well established before the lespedeza has made much growth, and are better able to withstand competition. Likewise if the lespedeza is pastured closely grasses will not be injured. On worn land a heavy rate of seeding is advisable, especially where the land has not been plowed for several years. On thin pastures, 6 to 8 pounds per acre is a desirable rate.

INOCULATION

Doubtless the lespedeza nodule-forming organism is now present in most Kentucky soils, particularly in the western part of the state. However, unless it is known certainly that either lespedeza or cowpeas, which are inoculated by the same strain of bacteria, occupied the land previously, it is always advisable to inoculate the seed. This is easily done with a commercial culture or with soil known to contain the proper organism. Directions for using commercial cultures are always printed on the containers and these directions should be followed faithfully. To inoculate with soil, first screen the soil; then spread out the seed and moisten it slightly; then sprinkle the screened soil over the seed using about a quart to each bushel of seed. It is necessary to shovel the seed over several times to mix the soil thoroughly through it. After inoculation the seed must be spread out and allowed to practically dry before sowing, so it will pass through the seeder readily.

Treating the seed with both soil and a commercial culture gives greater assurance of good inoculation than the use of either one alone, and this practice is recommended. Treatment with the commercial

cultures moistens the seed for soil treatment, which is carried out as where soil alone is used. The cost of inoculating with commercial cultures varies from 15 to 20 cents an acre depending upon the rate of seeding. Either lespedeza or cowpea cultures may be used. Soil for inoculating should be obtained, if possible, from a field that produced the previous year a crop of lespedeza or cowpeas with well-nodulated roots. On strongly acid soil or soil low in organic matter, it is advisable to inoculate the seed if it has been several years since cowpeas or lespedeza were grown. In such soil the bacteria do not live very long.

Lepedeza does not grow satisfactorily even on very fertile soil unless inoculated (or unless the nitrogen-fixing bacteria are already in the soil) and of course only soil nitrogen is used by uninoculated plants. It is often difficult to get good inoculation of Korean lespedeza sown on land for the first time, and it has been suggested that perhaps Korean requires a different strain of bacteria. This has not been proved, however.

The great importance of inoculation is shown by an experiment at the Illinois Experiment Station and reported in Illinois Bulletin 416. On limed land, inoculated Korean lespedeza made 2,260 pounds of hay per acre, as compared with 681 pounds where the lespedeza was not inoculated. On unlimed land, the yield of the inoculated plots was at the rate of 1,007 pounds an acre, and that of plots not inoculated only 218 pounds an acre. It was also found at the Illinois Station that the nodulation on Korean lespedeza is markedly affected by liming. A high percentage of the plants had good nodulation on acid soil only after limestone was applied.

ENEMIES OF LESPEDEZA

Diseases and Insects

All the lespedezas seem to be relatively free of disease in Kentucky; at least any such injury that may have occurred has not attracted attention. The same thing is true of insect attacks. Grasshoppers and other leaf-eating insects feed on the plants to some extent, but no serious damage has been reported.

Weeds

Dodder is by far the most serious pest of lespedeza. The appearance and habits of this parasitic plant are so well known that any description is unnecessary. It gives little or no trouble in lespedeza pastures. In fact, close grazing is the most practical method of eradication. In fields intended for hay or seed, however, dodder is very troublesome and can be controlled only by burning out or destroying in some other way. If infestation is severe, the field should be pastured as it is impractical to attempt control under such conditions. However, if dodder-free seed is sown, severe infestation seldom occurs in a new seeding. Responsible seed growers of today, especially grow-

ers of certified seed, go over their fields methodically at frequent intervals from early summer until the seed is ripe and burn out every patch of dodder found. Where this is done and the seed carefully cleaned with properly equipped cleaning machinery, practically dodder-free seed can be produced. However, even the most modern cleaning machinery does not remove all dodder if much is present. For the production of hay only the best quality of seed should be sown and the same system of field control should be followed as practiced by seed growers; otherwise fields may become so infested with dodder that they can no longer be used for growing lespedeza hay.

Many methods of destroying dodder in the field are used. Some growers scrape off all vegetation in the infested area and pile it in the middle of the scraped area to dry so it may be burned. This is very laborious. Others spread straw over infested areas and burn. Gasoline or kerosene torches are used to some extent. The method most widely used at present, and undoubtedly the most practical, is to sprinkle the infested patches with a mixture of about one part gasoline to 5 parts spent crank-case or crude oil, and burn. Kerosene to which a very small amount of gasoline has been added may also be used. On hot, sunny days the mixture vaporizes rapidly. In lighting it one must be careful to avoid being burned. Necessary precautions should be taken to prevent the fire from getting out of control. Korean lespedeza burns freely in hot, dry weather even when the plants appear somewhat green.

Other weeds are most troublesome when the stand of lespedeza is thin. Ragweed and buttonweed are usually most abundant but others also occur. Clipping gives effective control (see page 8).

WHAT TO SOW WITH LESPEDEZA

Pasture Mixtures

As previously stated, lespedeza seldom should be sown alone for pasture. All our common grasses can be used to advantage with it, and the following mixtures are suggested:

Orchard grass	12 lb	} Generally useful outside the Bluegrass region where considerable permanence is desired. Useful in the Bluegrass region for semipermanent pastures.
Lespedeza	5 lb	
Redtop	2 lb	
Timothy	8 lb	} A cheap temporary pasture; sow the timothy in the fall, if possible.
Lespedeza	6 lb	
Redtop	5 lb	} For wet land. Sow redtop in the fall, if possible.
Lespedeza	5 lb	
Bluegrass	15 lb	} A good mixture for the Bluegrass region. Bluegrass should be fall-sown.
Lespedeza	5 lb	

Hay Mixtures

Because of the relatively late maturity of lespedeza, it is frequently grown alone for hay. Some nitrogen will be lost from the soil, by leaching during winter and spring, unless a cover crop is sown. The small grains are excellent for this purpose and they will also furnish much winter and early spring pasture. If grazed heavily they usually do not interfere much with the growth of the lespedeza after the first of June, and any remaining could be clipped off after heading out.

If July and August rainfall is good, lespedeza, especially Korean, sown with grasses, makes a good yield of hay following the harvest of the grass crop.

LESPEDEZA IN THE ROTATION

Lespedeza, whether grown for hay, seed, or pasture, fits well into almost any cropping system. On slopes which must be in pasture much of the time, or wherever grazing is important, cultivated crops should be followed with small grain which may either be harvested or used for pasture. If a bluegrass pasture is to be established, the seed should be sown with the grain in the fall and lespedeza sown in the spring. By sowing timothy with the bluegrass, a hay crop may be produced the next year. Then the field may be used for pasture as long as desired. Outside of the bluegrass region, orchard grass may be substituted for bluegrass and timothy. Generally it pays to sow a few pounds of redbud also. Orchard grass makes good hay if cut when in bloom.

In sections where more intensive cropping is followed, the following rotation may prove practical.

First year—Corn or tobacco followed by small grain.

Second year—Small grain in which lespedeza is sown. The lespedeza may be used for hay or seed, or it may be pastured.

Third year—Lespedeza for hay or seed. Small grain sown on stubble in fall and grass sown.

Fourth year—Small grain; lespedeza and grass pastured.

Fifth year—Lespedeza-grass pasture. The field may be kept in pasture for several years if desired.

This rotation may be modified in various ways, as, for example:

1. First year, corn or tobacco. Second year, wheat seeded to lespedeza and grass. Third and fourth year, lespedeza and grass.

2. First year, corn or tobacco. Second year, wheat seeded to lespedeza. Third year, oats seeded in the lespedeza stubble. Fourth year, lespedeza. Sowing a small grain in disked lespedeza stubble has been widely practiced in Kentucky for many years. This practice is economical because it requires a minimum of labor and the lespedeza reseeds itself.

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