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KOREAN LESPEDEZA IN KANSAS

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A Korean lespedeza pasture for dairy cattle, Labette county, Kansas. This crop of lespedeza was grown with Balbo rye which has been grazed off.
(*Photograph courtesy Soil Conservation Service.*)

INTRODUCTION

There are more than one hundred known species of lespedeza, of which 17 are native to the United States and only 8 to Kansas. Only two of the known species are annuals, the others being perennial herbs or shrubs. The two annuals have assumed the greatest importance as cultivated crops. Not until recently, and only in the southeastern United States, has the perennial species *Lespedeza sericea* become important as a cutivated crop.

The two annual species, common lespedeza *(Lespedeza striata)*

1. Contribution No. 324 from Department of Agronomy.

and Korean *(Lespedeza stipulacea),* are indigenous to the Orient, where they are occasionally cut for hay in their wild state, but are not cultivated as crops. Only in the United States have lespedezas become crop plants, and here only the introduced species.

Common lespedeza is said to have been introduced into the United States in packing material and has been known in this country since before the Civil War. It occurs naturally in the southeastern counties of Kansas, but has never become an important crop in this state, chiefly because it requires a longer and more humid growing season, and because it does not produce sufficient top growth under Kansas conditions.

Korean lespedeza was first sent to the United States in 1919 from Korea, hence the name Korean. It was grown at the Arlington Experiment Farm and later distributed in the eastern states. From there it spread westward, and since 1930 it has become an important crop in southeastern Kansas.

FIG. 1. A "close-up" view of Korean lespedeza in an unmowed field, showing the erect type of growth in a dense stand.

General Characteristics

Korean is the only lespedeza of any importance as a crop in Kansas. It is an annual legume, resembling the common lespedeza somewhat, but distinguishable from it by the shape of the leaf, the leafy bracts which tend to enclose the seed pods of Korean lespedeza, and by the larger size. In thick stands Korean lespedeza grows upright and without basal branches, attaining a height of from 4 to 24 inches or more depending upon soil and climatic conditions. In

thin stands or under grazing it does not grow tall, but branches profusely at the base, the branches spreading near the surface of the soil, sometimes as far as 15 to 20 inches.

Korean lespedeza is a warm-weather crop, hence does not germinate until fairly late in the spring and makes no rapid growth until early June. When seeded alone on tilled land it is usually ready to be grazed sometime during the month of June, but where it is grown with a cereal grain the pasturing date is delayed somewhat except where the cereal is removed early by grazing or for hay.

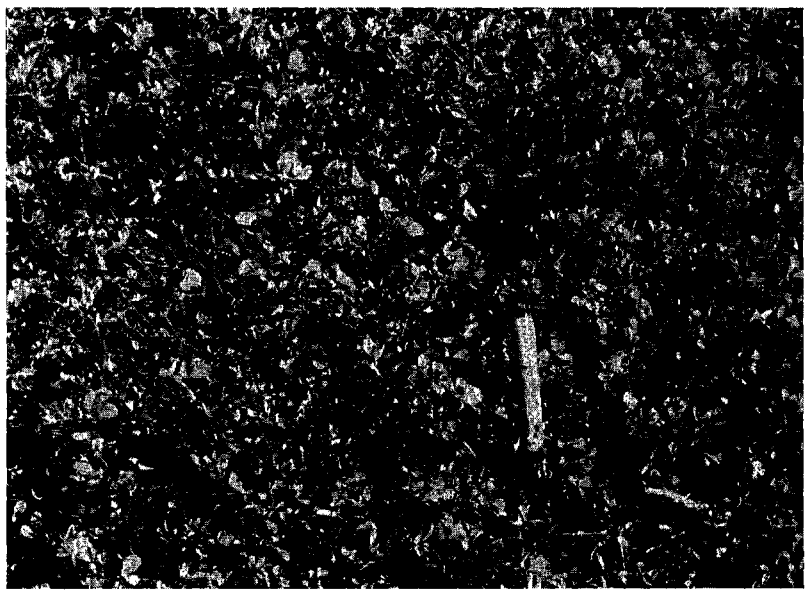

FIG. 2. Korean lespedeza under heavy grazing. The object in the center of the picture is an automatic pencil about six inches in length.

There are three strains of Korean lespedeza, based on earliness of maturity. The ordinary or standard variety commonly grown in Kansas, an extra early, and an extra late variety. Neither of the latter two strains have become important in Kansas because the extra early strain fails to furnish as long a grazing season as the standard strain and the late variety frequently fails to mature before frost.

Region of Adaptation

The region of adaptation of Korean lespedeza includes the transition area between the Corn Belt and the Cotton Belt, extending some distance into each. In Kansas it is best adapted to the area east of the Flint Hills, because the moisture supply is not generally adequate west of that area. Hence lespedeza frequently makes un-

satisfactory yields of forage and cannot be depended upon to produce seed regularly. Lespedeza is grown throughout the eastern part of the state, but is best adapted to the southern counties, becoming less important farther north where alfalfa and sweet clover can be grown more easily.

Soil Adaptation

Korean lespedeza is adapted to a wide variety of soils, including those which are low in fertility and acid in reaction. It will withstand considerable drought after it has become well established, but

FIG. 3. Korean lespedeza growing in loose, finely broken shale and rocks in southeastern Kansas.

should not be considered a truly drought-resistant crop because it requires fairly abundant supplies of moisture to make satisfactory yields of forage. It will not grow well, however, on poorly drained soils.

Like other crops, lespedeza responds to rich soils, but the application of commercial fertilizers to lespedeza alone is of doubtful value. Where lespedeza is grown in a rotation it is more practical to fertilize for the other crops as they generally show greater responses. For example, it is usually more profitable to apply phosphate fertilizer to the oats than to the lespedeza in an oats-lespedeza rotation, and it is more practical to apply lime and phosphate for sweet clover than for lespedeza in a rotation which might include both these legumes.

Seeding Lespedeza

Korean lespedeza is an easy crop to seed, often requiring no seedbed preparation. It usually responds to careful treatment, however, and the method of seeding will depend upon the use to be made of the crop. The most common method of planting lespedeza is to broadcast it in a cereal grain during February or early March. This method is also employed when planting it in newly seeded tame grass mixtures, in depleted native pastures, or on denuded areas for erosion control. It is advisable to cover the seed by packing or by harrowing lightly if the fields are not frozen or wet.

Seeding early usually allows ample time for the seed to be covered by rains and by the natural checking of the soil which occurs when the surface freezes and thaws. Weathering also appears to have a beneficial effect on germination, reducing the percentage of hard, ingerminable seed.

Lespedeza is seldom seeded alone, but if this should be done it may be drilled in April. The seedbed should be firm and the seed placed near the surface.

Inoculation of the seed is seldom necessary in southeastern Kansas, for the nodule forming bacteria are present in most of the soils.

The rate of seeding Korean lespedeza will depend upon the use to which it is to be put. Twelve to fifteen pounds of unhulled seed per acre will usually give a full stand the first year if it is planted on a well-prepared seedbed, although some growers prefer to plant as much as 25 to 35 pounds per acre. There is no objection to using large amounts of seed where it can be obtained at a low cost, and on poorly prepared seedbeds, such as might be found where lespedeza is to be sown primarily to stop erosion, the heavier rates should be used to insure a dense stand the first season. Lespedeza should also be seeded fairly thickly where it is to be used as a hay crop, because growth is more upright in heavy stands. Where it is seeded with a cereal grain to furnish summer grazing after the grain has been harvested the stand need not be quite so heavy as grazing tends to cause the plants to extend their growth laterally.

If lespedeza is to be seeded in a new tame-grass pasture or in a depleted native pasture, lighter rates are recommended because it is not desirable to have full stands. Five or six pounds per acre broadcast uniformly over the area should give a stand sufficiently dense to fill the spaces between grass plants. In extremely thin pastures somewhat heavier rates of application can be used.

Uses of Korean Lespedeza

The ability of Korean lespedeza to grow and establish itself on acid soils and on soils low in fertility makes it valuable in areas where these conditions make it difficult to grow the better legumes. Lespedeza therefore provides an additional legume which should not be used instead of alfalfa and sweet clover, but rather to supplement them and thereby bring about an increase in the total acreage of

leguminous crops grown on the farm. It is equally important that lespedeza should not be used in place of the liming and phosphating so necessary on certain soils in southeastern Kansas, nor is it a substitute for sound crop rotations or recognized cultural practices. If these limitations are recognized and lespedeza is used accordingly it can be used to advantage in many cropping systems in east central and southeastern Kansas.

LESPEDEZA FOR PASTURE

Lespedeza is most commonly used for pasture, but may be made into hay of fairly high quality. A certain amount is cut for seed each year, but seed prices have recently been so low that the crop as a whole has been more valuable for pasture. It is palatable and nutritious to all classes of grazing animals, and is particularly valuable because it furnishes pasturage during the hot summer months when other pasture crops are less likely to be available.

One of the chief methods of utilizing lespedeza is to seed it with oats or other small grain in the so-called one-year rotation. It is broadcast in the grain during the early spring, germinates in April, and is ready to be grazed soon after the grain crop has been removed. It matures seed in the fall and volunteers the following season so that the rotation can be repeated each year without reseeding the lespedeza. Since lespedeza must be permitted to mature seed in the fall if this rotation is to be continued without reseeding the legume, it is most commonly sown with oats or spring barley. The land need not be worked until spring thus allowing the protective cover of lespedeza stubble to remain on the land over winter and also allowing ample time to prepare a seedbed for the cereal. If the winter cereals are used there may not be sufficient time in the fall after the lespedeza has matured to prepare a good seedbed for wheat, barley, or rye. Furthermore, after having grown a crop of lespedeza during the summer, the soil is likely to be exhausted of moisture and somewhat compacted by the grazing animals. As a result the soil may be so dry and cloddy that a suitable seedbed cannot be prepared for fall-seeded cereal. Also the soil may be so dry following lespedeza as to delay germination and curtail fall growth of the cereal.

The use of a one-year rotation of oats and lespedeza or the use of lespedeza seeded in any cereal grain adds a great deal to the flexibility of the cropping system by providing several alternative methods of utilizing the crop. For example, if no other spring pasture is available or if the grazing of native pastures is to be deferred in the spring, the grain crop may be utilized completely for grazing. If sweet clover or tame perennial pastures are available the livestock may be removed from the grain fields and placed on these pastures in time to permit the maturing of a grain crop. Whether the cereal is used for pasture or for grain the lespedeza seeded in it will be available for grazing during the summer to supplement the native pasture. If there is sufficient native pasture it may be profit-

able, in certain seasons, to save the lespedeza for hay or for seed, but it will be available for grazing should the native pasture fail to produce as much pasturage as was anticipated. Furthermore, it is far better to have a crop of lespedeza in the grain stubble than to have the summer weeds which would otherwise appear after harvest.

LESPEDEZA IN TAME PERENNIAL PASTURES

The ability of lespedeza to seed well and to volunteer readily makes possible its use in tame perennial pastures. It is less valuable than alfalfa for this purpose and wherever possible this crop should

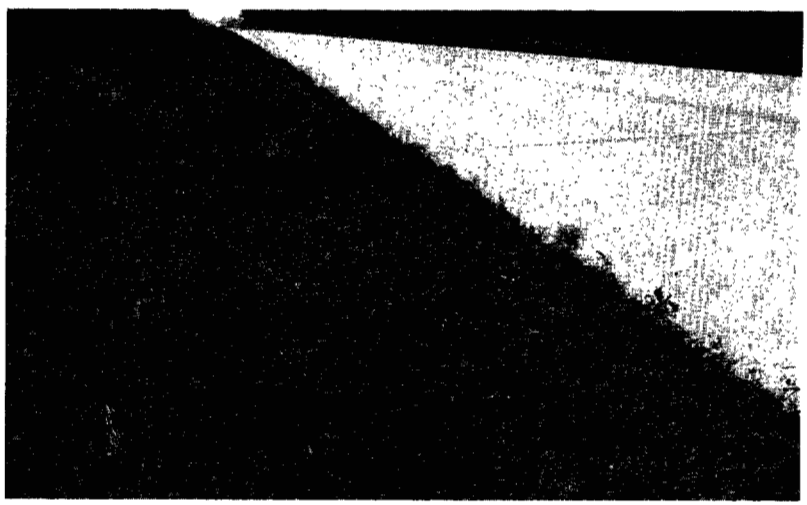

FIG. 4. Korean lespedeza is an excellent vegetative cover for the protection of highway shoulders.

be used instead of lespedeza, although they may both be included in the mixture. When used for this purpose lespedeza is not seeded with the grasses in the fall but is broadcast early the following spring.[1] Alternate freezing and thawing of the surface soil helps cover the seed which then germinates at the usual time and provides a leguminous plant in the pasture mixture.

LESPEDEZA FOR EROSION CONTROL

One of the chief advantages of lespedeza is the ease with which stands can usually be secured. It is often possible to start lespedeza without seedbed preparation of any kind, and for this reason it may be used in the stabilization of eroded areas and abandoned lands. Once a thin stand has been established it will gradually thicken and finally bring about complete stabilization. Lespedeza has been used

1. See Kans. Agr. Expt. Sta. Circ. 206—Tame Pastures in Kansas.

successfully in this manner on the banks of excavations and along road cuts.

Where spring seeded crops in east central and southeastern Kansas follow small grains in the crop rotation, the long period during which the soil would normally lie idle should be utilized by lespedeza pasture. The legume is broadcast in the grain in the spring and pastured from July until frost. The remaining stubble protects the soil from erosion until the land is plowed the following spring.

In the apple growing area of northeastern Kansas lespedeza has attained considerable importance for its ability to control soil erosion in orchards. It is planted as a permanent cover crop on sloping

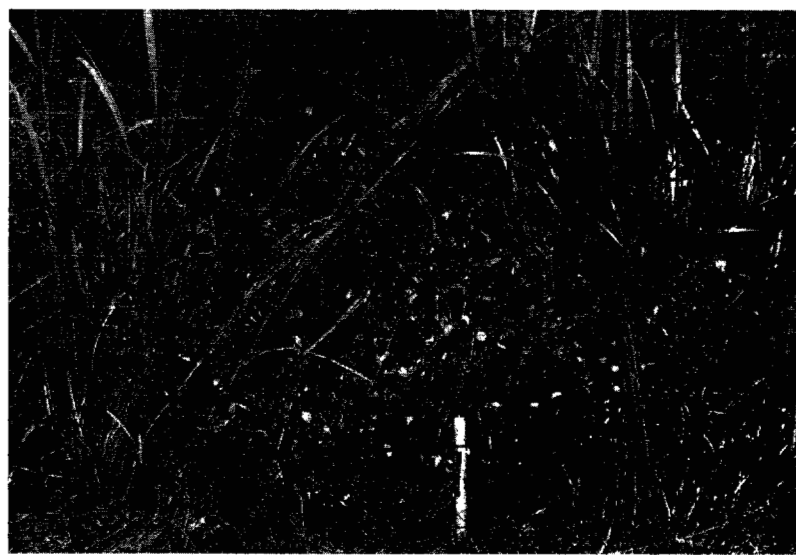

FIG. 5. An example of Korean lespedeza properly used in the improvement of depleted native bluestem pastures. Restricted grazing has allowed the bluestem grasses to make a vigorous summer growth.

orchard land, and once established it continues to volunteer each year. There may be occasional seasons when this crop fails to mature seed in northeastern Kansas, but after the crop has seeded a few times there apparently remains in the soil a sufficient amount of ungerminated seed to produce a fair cover even after such a season.

Lespedeza is particularly suited to use in orchards because with its relatively shallow root system, it offers less competition for soil moisture and plant nutrients than would alfalfa, sweet clover, or the tame perennial grasses. Furthermore, the comparatively small top growth of lespedeza offers no hindrance to the normal operation of the orchard. Should the top growth become large in a particularly favorable season it may be mowed during the summer. The low,

dense, spreading habit of growth induced by mowing may be of additional benefit in erosion control.

LESPEDEZA IN NATIVE PASTURES

Another use to which Korean lespedeza is sometimes put is for seeding in depleted native grass pastures. This can be a beneficial practice in that it provides cover for denuded areas until the grasses can be reestablished and doubtless enriches the soil somewhat by the addition of nitrogen. It also provides additional pasturage, growing on areas that would otherwise be bare or at best covered by weeds. Herein may lie a danger. The presence of additional forage in the form of lespedeza may tempt one to graze the pasture so closely that the weakened native grasses will suffer still further injury from overgrazing. Such a practice will do more harm than good, and lespedeza can only be of benefit in depleted native pastures if grazing practices are regulated so as to encourage the reestablishment of the perennial grasses.

LESPEDEZA FOR SOIL IMPROVEMENT

Lespedeza is less valuable than sweet clover as a soil improvement crop because it supplies less nitrogen and organic matter to the soil. Greater increases in crop yields may be expected following sweet clover than following lespedeza. On the other hand, lespedeza is a better soil improvement crop than soybeans or cowpeas, due partly, at least, to the fact that these crops are generally removed from the field in the form of hay, whereas lespedeza is usually pastured. More nitrogen and organic matter will be added to the soil under grazing than where the crop is removed as hay.

Lespedeza has been shown to grow under conditions of soil acidity and low soil fertility, which fact may encourage the practice of substituting its use for lime and phosphate treatments where these are needed or to substitute it for sweet clover or alfalfa in the crop rotation. It is reemphasized here that Korean lespedeza should never be substituted in such a manner. It should not be used to compete with these crops and cropping practices, but to supplement them. The most profitable farming systems take into consideration these limitations of lespedeza and are able to make use of it efficiently as an additional leguminous farm crop.

Seed Production

Lespedeza is most commonly used for pasture but a certain amount is harvested each year for seed either as a cash crop or by growers wishing to produce their own seed. Occasionally a field intended for pasture may not be needed for this purpose and is allowed to grow to maturity for seed harvest. Seed is produced regularly in southeastern Kansas even on fields which have been grazed. If the seed is to be harvested it is best to graze only lightly, if at all, and to remove the livestock early, because grazing tends to induce a low, spreading habit of growth, making harvest difficult.

Yields of lespedeza seed are variable and depend upon moisture supply, general level of soil fertility and length of growing season. Near the northern limits of its region of adaptation early fall frosts may result in serious reductions of seed yields. Under average conditions and on average soils in southeastern and east central Kansas yields of 300 to 400 pounds of unhulled seed per acre may be expected. On good soils in favorable seasons yields of 800 to 1,000 pounds of seed per acre are reported, while in extremely dry years or on soils low in fertility they may be as low as 100 to 150 pounds.

Korean lespedeza usually may be harvested most efficiently with an all-purpose combine harvester. The seed does not shatter badly when standing undisturbed, so the crop can be allowed to ripen completely and combined after frost, at which time there is no green plant material to interfere with efficient threshing and cleaning.

FIG. 6. A field of Korean lespedeza heavily infested with dodder.

If a combine is not available the seed crop may be harvested by mowing, cocking, and threshing much in the manner of harvesting alfalfa for seed. In this case the crop should be cut as soon as most of the seed is ripe and should be handled in the mornings when it is wet with dew or after a light shower in order to reduce shattering to a minimum. After drying a few days the cocks may be threshed in a grain thresher adjusted for threshing oats, taking care not to use too much air or seed will be blown over into the straw. It may also be threshed in a clover huller adjusted correctly and operated carefully but it is more satisfactory to use a grain separator as this does not remove the hulls from the seed. It is relatively easy to separate dodder seed from unhulled lespedeza seed.

Weeds in Lespedeza

Weeds may sometimes be numerous in fields of lespedeza but are seldom troublesome except in thin stands. Good stands following a small grain crop are usually quite free of weeds. The presence of small numbers of weeds is not particularly harmful unless the field is to be cut for seed, in which case they may usually be eradicated by mowing in July. Mowing at that time will also induce the lespedeza plants to branch more profusely and may result in increased seed yields.

One of the most serious weeds found in seed fields of lespedeza is dodder, a parasitic, twining plant which occurs in patches. Its seeds

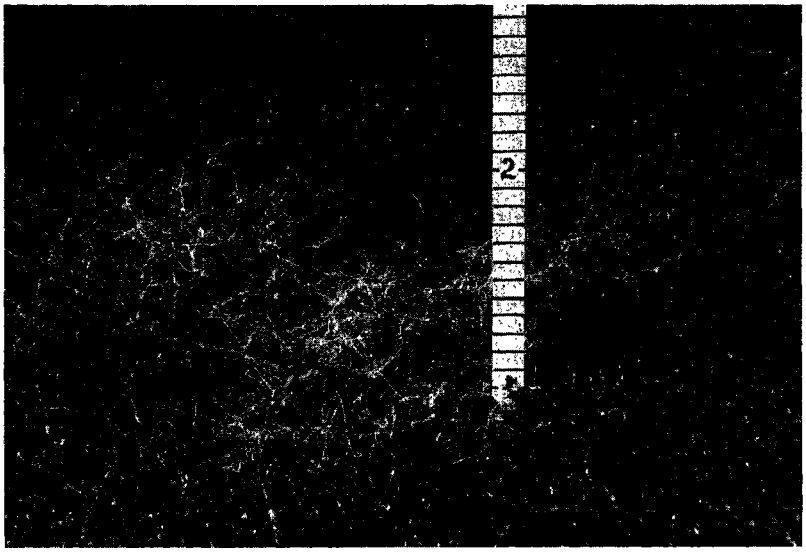

FIG. 7. Dodder is usually found only in isolated patches in the lespedeza field. These patches may be eradicated by burning.

are difficult to separate from small seeded crops like hulled lespedeza, sweet clover or alfalfa. Patches of dodder should be destroyed as soon as they appear. If neceseary a few fork fulls of straw may be piled on the spot and burned. Needless to say, fields containing dodder should not be cut for seed unless the weed has first been destroyed.

Feeding Lespedeza Seed to Livestock

The price of lespedeza seed has in recent years reached a sufficiently low level to arouse interest in the possibility of using it as a livestock feed. No experimental data are yet available by which it may be compared to the other legume seeds because the demand for

this information is so recent. However, alfalfa and other small, leguminous seeds have been used for livestock feed, and there is no apparent reason why lespedeza cannot be fed in the same manner. It is considered much more profitable to utilize the crop for grazing, but conditions might conceivably arise where small amounts of the seed could be used profitably as feed.

The seed of lespedeza is quite hard so it is recommended that it be ground finely, otherwise large amounts may pass through the digestive tracts of livestock.

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