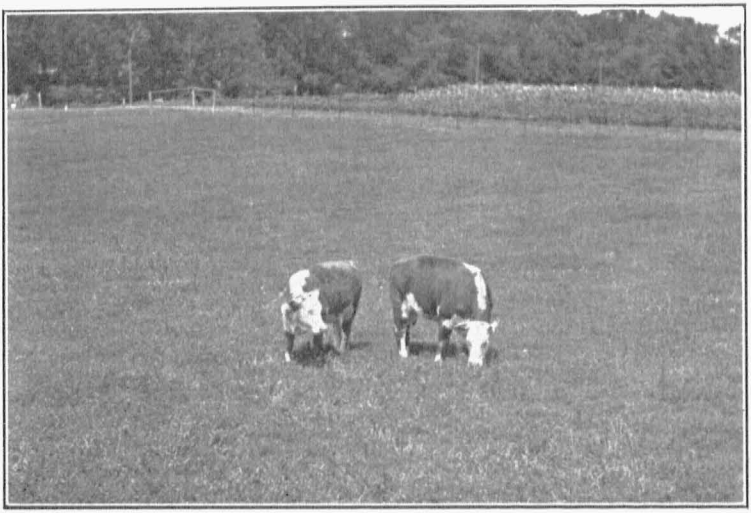
UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
BULLETIN 280

Korean Lespedeza in Missouri



Cattle grazing on Korean lespedeza.

COLUMBIA, MISSOURI
FEBRUARY, 1930

UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE

Agricultural Experiment Station

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Korean Lespedeza in Missouri

W. C. Etheridge, C. A. Helm, B. M. King

Korean lespedeza has proved itself well adapted to Missouri soils and seasons. During the past six years the Missouri College of Agriculture has studied the general usefulness of the legume in this State. The crop has been sown on outlying experiment fields and tested intensively at Columbia.* Seed has been sent to farmers for local trials.

Korean, Kobe, and Common Lespedeza

In recent years the Korean and the Kobe varieties of lespedeza have been introduced into Missouri. Common lespedeza, known also as Japan clover, has been native to the southern third of the State for many years, where in the Ozark section it furnishes the principal natural pasturage on open and non-cultivated land. The soil adaptations of the three varieties of lespedeza are apparently very similar. All appear to be tolerant to acid soils and will grow and reproduce on either fertile or poor land.

The three varieties differ, however, in the stage of maturity and the amount of growth developed during the season. In time required to mature the Korean is early, the Common is medium late, the Kobe extremely late. Korean will safely mature seed anywhere in Missouri. Common also will mature over a broad territory, but is much better adapted to the southern half of the State. Kobe will ripen regularly in the southern third.

Korean and Kobe apparently are about equal in the size of their growth and yield during the season. Either greatly exceeds in yield the Common variety (Fig. 1). Kobe under favorable conditions in the extreme southern part of the State may produce a somewhat larger growth than could be obtained from Korean. Its late maturity, however, makes its usefulness in Northern Missouri very uncertain. Korean is the most widely adapted variety when both yield and safe ripening of seed are considered.

Growth Habits of Korean Lespedeza

Korean lespedeza is an annual legume, coming each spring from the seed. Sown in that season on wheat or with oats, sown alone or sown on pasture land, it starts growth during the first mild days in April.

*The pasturage tests reported in this bulletin were conducted cooperatively with the Department of Animal Husbandry. Mr. J. E. Comfort of that Department was responsible for the management of the grazing cattle. He collected all records of their weights and condition.

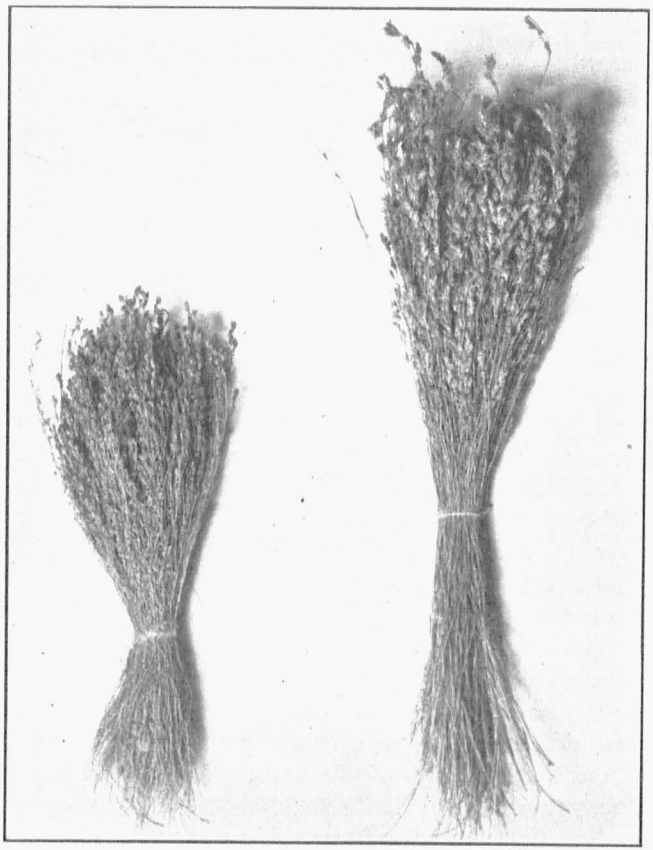

Figure 1.—These bundles show the relative growth of common lespedeza (left) and Korean lespedeza (right).

It progresses rapidly with continued warm weather, and reaches full stature about the middle of June, which is maintained through July and August when native pastures are at their lowest stage (Fig. 2). An abundance of seed is produced, whether the crop has been cut for hay or pastured, to reseed naturally a full stand the following spring. Ripening is complete by the time of the first light frosts in September.

Where the stand is thin or sown in rows the plants are prostrate in growth, developing trailing habits. In a thick stand, however, the growth is upright, similar to that of red clover or alfalfa.

Soil Adaptation

Korean lespedeza is generally adapted to all soils within the State. It is known to grow well on acid soil, though it has not seemed to thrive

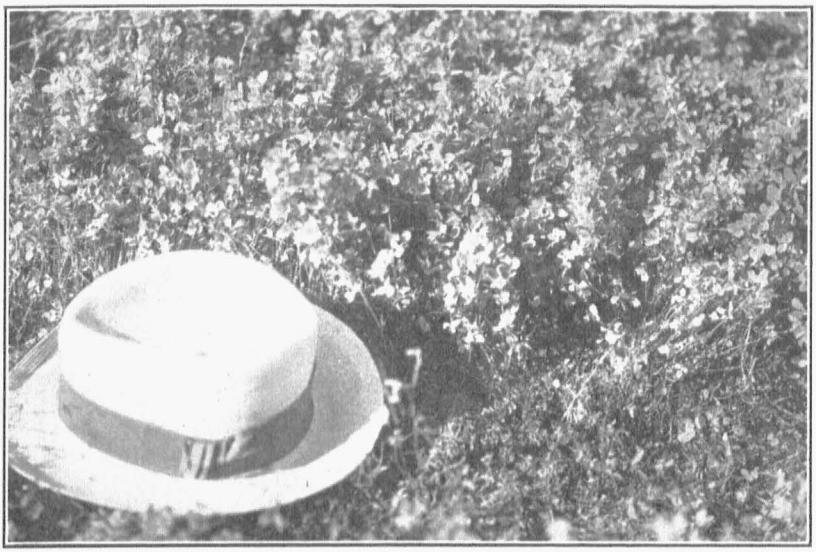

Figure 2.—The growth of Korean lespedeza in early July is shown here. The land is only moderately fertile and no lime or fertilizer was used.

vigorously on land that is extremely flat and poorly drained. Yields of the crop respond to the relative fertility of the soil. On moderately fertile land a growth equal to that from the first cutting of good red clover may be obtained. On poor soils there is likely to be a considerable growth every year for grazing, but only the most favorable seasons will produce there a growth tall enough to cut for hay.

Korean Lespedeza on Poor Land

Although this new legume may in some cases be used to advantage on the more productive soils, its greatest merit is the ability to establish a stand on worn or abandoned farm land. Sown lightly in the spring it will produce a dense volunteer growth from its own seed a year later. Once established it maintains itself indefinitely, affording considerably more pasturage than could be obtained from any other legume without costly soil treatments. Numerous erosions that occur in all land left idle are gradually filled by the growth of this plant. Such meager lands instead of becoming poorer each year, will gradually be improved in both fertility and physical condition, and will make surprising returns in pasture.

Idle and waste land can be sown easily and cheaply. Seedbed preparation is not necessary, and generally not desirable. Where

a heavy growth of weeds from the season before has been frosted down, the field should be burned over in early spring and the seed sown on the cooled ashes without working the soil.

Not a Competitor of Red or Sweet Clover

Korean lespedeza is not directly competitive with red clover or sweet clover. On the more productive land either of the latter varieties will make greater returns in hay or pasture and prove more beneficial to the soil.

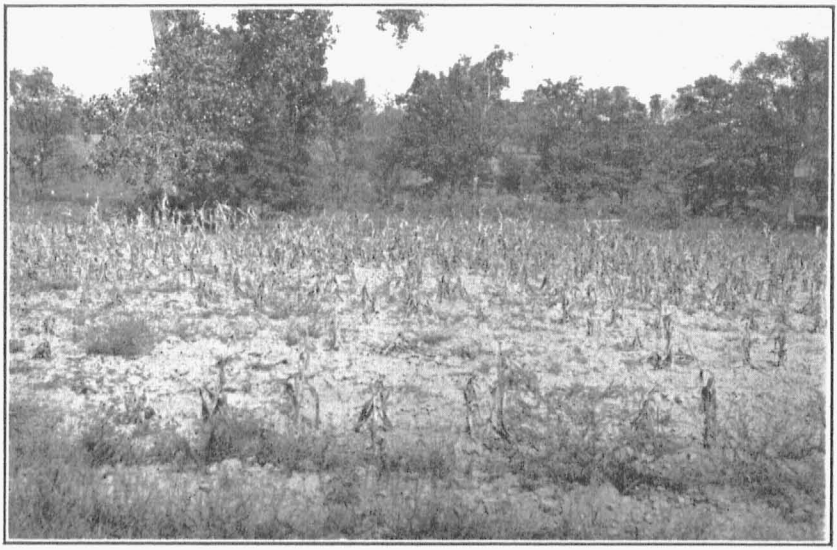

Figure 3.—This starved growth of corn lay next to the Korean lespedeza and sweet clover shown in Figure 4, and indicates the natural poverty of the soil producing the two legumes.

Sweet clover, however, on land medium to low in fertility will not usually grow without expensive soil treatments. Red clover on such soils will grow only fairly well, and if the land is both poor and sour, costly treatments are usually necessary for successful production.

Whether the farmer should go to the expense of growing red or sweet clover, or should use Korean lespedeza as a substitute, can be determined only after considering the conditions of the individual case. (Figs. 3 and 4.)

Korean lespedeza can be grown to advantage on many soils where production of the clovers is difficult or impracticable. It may be sown in small grain crops, in grass-clover mixtures for temporary or permanent pasture, or on idle and waste land not now affording any profits and yearly becoming less valuable.

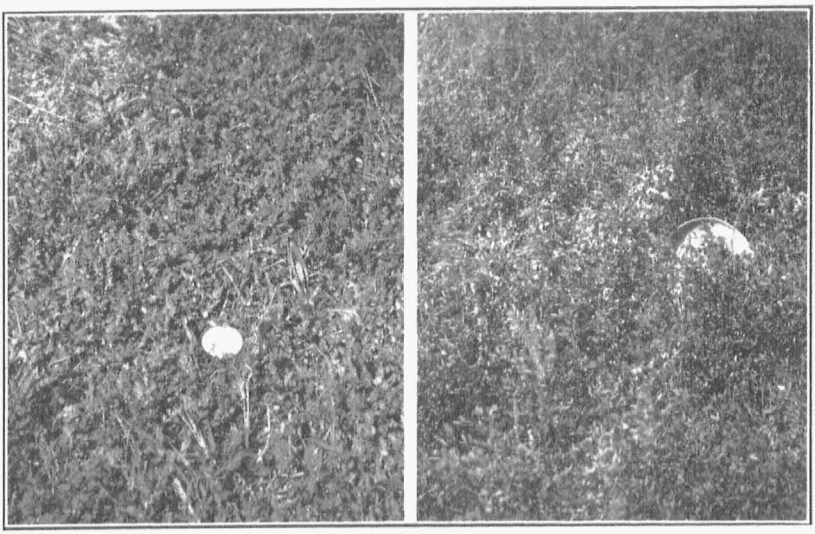

Figure 4.—Stubble growths of Korean lespedeza (left) and sweet clover (right) are shown here. Both legumes were sown on wheat which received 200 pounds per acre of a 2-12-2 fertilizer. The sweet clover land had also been treated with 3 tons of ground limestone per acre, but no lime had been applied to the lespedeza. The low natural productivity of this soil is indicated in Figure 3.

Method and Time of Seeding

Korean lespedeza is best sown in the spring during late March or early April. It may be sown with oats immediately after the seed grain has been covered, or 10 days to two weeks later, after the grain crop is up.

The time of seeding on wheat may well be delayed until April, after the danger of severe freezes is past. Seedings should be made, however, before the ground has dried out and while the surface soil is alternately freezing by night and thawing by day. If the sowing is later the wheat ground should be harrowed before the lespedeza seed is put in.

Korean lespedeza establishes itself more quickly where the ground is firm and well packed. For that reason it is more likely to succeed and make a larger growth the first season if sown on wheat rather than with oats.

The seed is not difficult to sow and may be distributed by a grass-clover seeder, by a wheelbarrow seeder, or by a grass-clover attachment on a grain drill.

Rates of Seeding

From 5 to 10 pounds of seed to the acre should be sown where a full growth is desired that season, whether the crop is seeded alone or seeded with wheat or oats. A thin stand may be obtained from sowing

only 2 to 3 pounds of seed in wheat or oats and in the fall will ripen an abundance of seed to produce a dense volunteer growth the following spring (Fig. 4, left).

Korean lespedeza apparently is resistant to early spring freezes. Observations on the Experiment Station field at Columbia indicate that late freezing weather is more likely to injure young red clover or alfalfa than lespedeza. It is certain that lespedeza may be sown early in the spring with no great danger of losing the stand. There is, however, no special advantage in seeding extremely early, since the crop does not grow rapidly until warm weather.

Pasturing Korean Lespedeza

The growth of lespedeza starts slowly in the spring and does not progress rapidly until early summer. Grazing may begin by the middle of June and be continued through to frost in September, depending upon the size of the growth and the rate of its use. In dry weather light grazing from early June onward will often give greater returns for the season than delaying the use of the pasture until July. This is especially true if the stand is very thick. Grazing when the ground is water-soaked will injure both the stand and the soil.

At the Missouri Experiment Station, in the summer of 1928, a volunteer growth of Korean lespedeza, reseeded from a stand sown in the spring of 1927, was pastured in order to learn its carrying capacity and its ability to reseed again under close grazing (See cover page). From June 26 to July 12, three 2-year-old heifers were carried on this pasture, which measured only three-fourths of an acre. Their total gain was 71 pounds over the period of 48 cattle days.* From July 12 to August 9 the stand was allowed to renew its growth, and on the latter date two 2-year-old heifers were turned in to graze until September 15. For this period the total gain of the two animals was 169 pounds and the cattle days numbered 74. Thus the five animals grazing without supplementary feed over a total period of 122 cattle days made a total gain of 240 pounds from less than an acre of Korean lespedeza pasturage. The animals when first turned on the pasture weighed an average of 798 pounds per head. They were medium fat at the beginning of the grazing period and appeared to gain in flesh until near the end. When the test was concluded their condition was described as medium fat to grass fat.

From July 1 to September 4 of 1929, two yearling heifers grazed the volunteer stand produced by the natural reseeding of 1928. For this period of 132 cattle days the animals made a total gain of 137 pounds, a rate of 1.04 pounds daily per head from the three-fourths of an acre pasture. For the month of July, before an intense drought had shortened

*The term "cattle day" as used here means 24 hours of grazing for one cow or heifer.

the pasturage, the daily gain per head was about 2 pounds. In this season as in 1928 the cattle, though well supplied with water and salt, fed wholly from the lespedeza. At the beginning of the test the average weight of the heifers was 581 pounds and their condition was that of medium fat cattle. They appeared to gain in flesh through July and early August, and although their general condition later seemed to decline, they were in better flesh at the end of the grazing period than at the beginning.

The cattle in this test seemed at all times to relish the pasturage. No bloat or indigestion was apparent. Nor was there a marked laxative effect such as that frequently resulting from sweet clover pasturage.

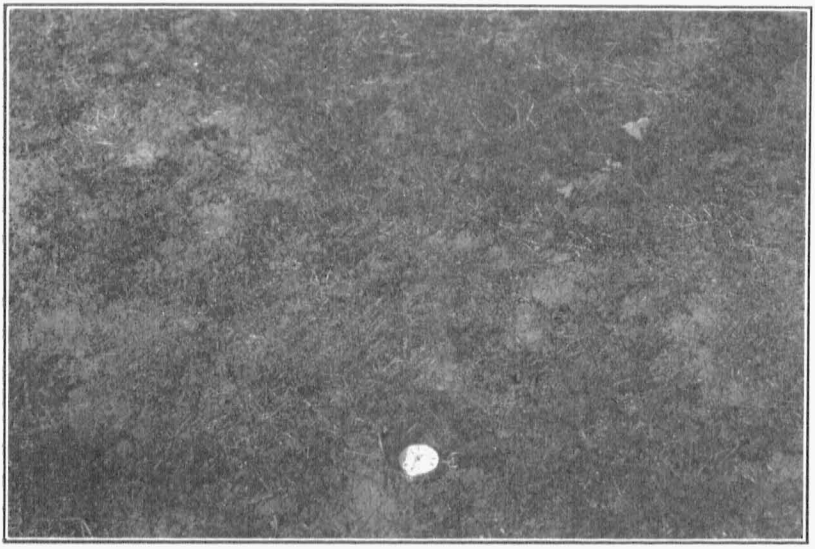

Figure 5.—The stand of lespedeza left in this condition at the end of the grazing season in 1928 reseeded an extremely dense growth in 1929.

In both seasons the pasturage had been cropped so close by the end of the grazing period that the gains of the heifers naturally diminished as the herbage was shortened. But even this severe treatment of the lespedeza did not prevent the ripening of an abundance of seed for a natural reseeding in the following spring (Fig. 5). The emergence of a dense volunteer stand in April of each year was complete proof that Korean lespedeza possesses the highly important ability of an excellent pasture plant to produce seed plentifully under close grazing.

In partial confirmation of the feeding value indicated by the grazing test, the following brief analyses of alfalfa, sweet clover, and Korean

lespedeza are presented, the chemical percentages being on the basis of air dry material.

	Moisture	Ether extract	Nitrogen	Protein	Crude fiber	Ash	Phosphorus	Calcium
Alfalfa	7.62	2.87	3.05	19.06	23.49	8.24	0.37	1.29
Sweet clover	6.67	1.79	2.62	16.38	30.90	6.74	0.20	0.95
Korean lespedeza	7.14	3.27	2.59	16.19	25.97	7.43	0 35	1.23

These data suggest that the feed constituents of Korean lespedeza are fully equal to those of sweet clover and not far below those of alfalfa. More extensive analyses of samples taken at progressive stages of growth would be required for a complete chemical comparison of the three plants. It is to be noted, however, that the above analyses are in each case of young plants, the samples having been taken early in August from the second growth of first year alfalfa, from first year uncut sweet clover, and from ungrazed lespedeza. All samples taken were of crops growing on similar soil, only a few feet apart. The sweet clover land had been treated with 3½ tons of ground limestone per acre the fall before the spring seeding, and with 3 tons per acre three years previous to that fall. The alfalfa land had received 3 tons of ground limestone an acre before seeding in the previous fall. No lime had ever been applied to the lespedeza land.

Korean Lespedeza in Permanent Pastures

Korean lespedeza is a valuable legume to sow in permanent pastures of bluegrass, of red top, of orchard grass, or of mixed grasses. Its habits of growth and high nutritive quality make it especially suitable for mixtures with other pasture plants. Starting late in the spring it makes little progress until early summer, and then does not compete with the growth of other grasses and clovers which provide spring and early summer grazing. In July and August when native grass is short, the lespedeza makes its greatest growth, providing good pasturage through the dry summer months. By the middle of September its growth declines from maturity, giving way for the growth of grasses following rain in early fall.

In densely sodded bluegrass pastures Korean lespedeza likely will not increase the grazing returns. It will, however, establish itself on bare points and in places where for any reason the bluegrass sod and growth are poor.

In experiments on the Southwest Missouri and Ozark experiment fields Korean lespedeza was sown on wheat in the spring with orchard grass and other clovers, at the rate of only 2 pounds of seed to the acre.

It has there provided in its second and third seasons a considerable part of the summer pasturage (Fig. 6).

A few pounds of Korean lespedeza seed per acre added to a regular grass and clover mixture, sown after oats or wheat is harvested, will contribute to the yield of hay if the mixture is cut. If the mixture is grazed after one or two seasons of hay, it will gradually develop the major pasturage of the summer period.

Figure 6.—A mixed pasturage of orchard grass and Korean lespedeza in its second full season (1928) is shown here. The grass was sown with wheat in the fall of 1925, and the lespedeza was added in the spring of 1926. This pasture is on the Southwestern Missouri Experiment Field, Newtonia, Newton, County.

Korean Lespedeza for Hay

Korean lespedeza is less suitable for hay than for pasturage. If this legume is sown for hay on land of sufficient fertility to grow good crops of red clover, its returns are not likely to be as satisfactory as those from red clover. Red clover will make greater yields of hay during the season. It will start earlier in the spring, and its growth is more beneficial to the soil. In other words, on productive soils where Korean clover can be expected to make consistent yields of hay, red clover is preferable for the same purpose.

There are many thousands of acres of upland in Missouri, however, where red clover either makes a poor and uncertain growth, or cannot be produced at all. It is here that Korean lespedeza can be grown to advantage, even as hay. On the medium fertile soils, in favorable seasons, it will produce profitable yields (Fig. 7).

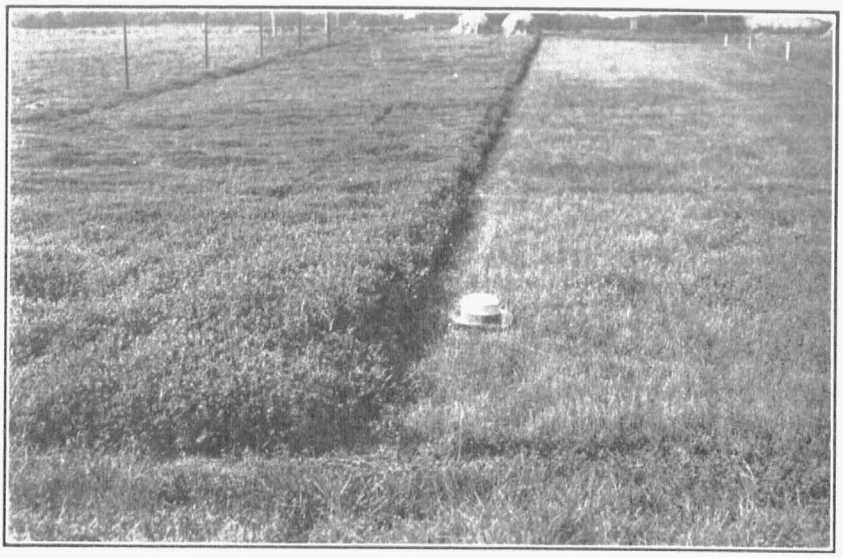

Figure 7.—The plot at the left shows a typical growth of Korean lespedeza late in July. A similar growth has been removed for hay from the plot at the right and grazed within the fenced area beginning at the upper left corner. This land without soil treatment will not grow a good crop of red clover.

Lespedeza for hay should be cut when in full bloom. At this stage the yield will be good and the quality at its best, and in the remainder of the season considerable second growth will be obtained. This later growth will always be sufficient to reseed the land, and may in addition provide some pasturage. On good land and in favorable seasons it may be possible even to harvest a seed crop after the hay crop has been removed. Measured yields of hay and seed in the following table, from lespedeza grown on land capable of returning an average crop of 35 bushels of corn per acre, indicate the ordinary productivity of this legume.

YIELDS OF KOREAN LESPEDEZA HAY AND SEED AT THE MISSOURI EXPERIMENT STATION 1929

Soil treatments	Pounds per Acre	
	Cured hay	Recleaned seed
Check plot (no treatment)	3065	369
Sodium nitrate 100 pounds per acre	2238	229
2-12-2 fertilizer 200 pounds per acre	3237	385
20% superphosphate 200 pounds per acre	3463	539
Lime 3 tons per acre*	2783	225

*From 2½ to 3 tons of ground limestone per acre were required to neutralize the acidity of this soil.

Our data from the use of fertilizers do not yet suggest a comparative soil treatment and are presented merely to show a range in yield under various degrees of fertility. Seed production per acre has ranged much higher than the foregoing figures. Row crops of lespedeza harvested by hand have returned as high as 875 pounds of recleaned seed to the acre.

Seed Production of Korean Lespedeza

Korean lespedeza best produces seed on soil of medium fertility. In order that the least quantity of seed will be lost in harvest, the ground should be prepared as level as possible.

If a seed crop is to be produced the first season from spring seeding, the seed may be sown either alone or with oats. In either case, 8 to 10 pounds should be used per acre. A cheaper, and perhaps a more practical method, is to sow from 2 to 5 pounds in the spring on either wheat or oats, allow the crop to reseed itself that fall, and depend on harvesting a seed crop the following fall and each fall thereafter.

If a seed crop is intended for the first fall, not more than one bushel of oats per acre should be sown as a nurse crop for the legume. The oats should be removed for hay in early June immediately after the grain has reached the milk stage.

The lespedeza crop should be cut for seed soon after all the plants have matured and have lost their green color. Generally this stage will occur during late September, and usually after one or two early frosts. The most common mistake is in cutting too early, which results in low quality and immature seed. In a dead ripe crop, however, a serious loss from shattering is likely to occur. If possible the harvesting should be done when the crop is wet from dew or following light showers.

The seed is best harvested by a mower drawn rapidly. The "shoes" should be removed from both ends of the bar and the bar tilted forward as

far as is practicable. A slotted pan attached to the cutting bar, though not necessary, is desirable, as it will save much of the best seed which would otherwise be lost by shattering. The harvested crop should immediately be placed in cocks small enough that the plants will dry rapidly.

Threshing should be done directly from these cocks 4 to 7 days after harvest, or the crop should be stacked and allowed to go through the "sweat" before threshing is attempted. In no case should the seed be left in the field to weather as is often done with red clover seed crops.

Threshing the Seed Crop

Either the clover huller or the grain thresher may be used for threshing lespedeza seed. The clover huller is the more efficient machine for this purpose and will completely separate all trash from the fully matured seed. The grain thresher, however, should be used if there is a considerable amount of matured weed seed in the crop. This machine does not remove the hull from the lespedeza and thus it leaves the seed in condition for a more effective recleaning.