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Lespedeza Sericea

The Newest Legume for Missouri

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BRIEF SUMMARY OF THIS BULLETIN

Lespedeza sericea is the newest legume for which a place in Missouri agriculture has been found. *Sericea* is a perennial plant renewing its growth every spring from buds formed on the roots in late summer and early fall of the previous season. The root system is deep, extensive, and able to penetrate tight subsoils. The crop is therefore highly resistant to drought.

Sericea can be grown without fertilizers or lime on all soils in Missouri, but its value as a crop on extremely poor land has not yet been established. It is probably less valuable than Korean *lespedeza* on soils which rank lowest in available fertility.

From the investigations reported in this bulletin and from practical observations, it appears that the best use of *sericea* will be as a hay crop on land of medium to somewhat less than medium fertility. On such land *sericea* may well take the place of alfalfa, sweet clover, or red clover, which cannot be grown there without expensive soil treatments. But *sericea* cannot compete as a hay crop with alfalfa or red clover on land naturally capable of producing these legumes successfully. Also it is not likely that *sericea* can equal Korean *lespedeza* as a pasture crop on any kind of land.

Sericea should be sown with wheat or barley in late spring. Scarified seed should be used at the rate of 25 pounds per acre. Shallow seeding on a firm or even solid seedbed is an essential condition for the successful establishment of the crop. Spring seeding with oats is not usually satisfactory, because the ground having been disked in preparation for the oats is then too loose and dry for the *sericea*. *Sericea* requires a full season in which to establish itself thoroughly.

Sericea in Missouri may be expected to produce two crops of hay in a season, or one crop of hay and one crop of seed, or one crop of hay followed by summer pasture.

Sericea cut before the bloom stage and properly cured produces an excellent quality of hay. The crop is best harvested for seed with a grain binder. It is then shocked and after ten days or two weeks of curing is threshed with the regular wheat-oats machine.

Lespedeza Sericea

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In recent years *Lespedeza sericea*, a perennial legume, has been distributed by the U. S. Department of Agriculture. This plant, selected from a group of wild lespedezas, was introduced in 1924 from Asia. It has been studied and tested by the Missouri Agricultural Experiment Station in cooperation with the Bureau of Plant Industry from 1931 to 1933.

Three strains of *sericea*, numbered 04730, 12087 and 17291, are now being grown for seed on a commercial scale. Two other strains, 19284 selected from 04730 and 17291 selected from 12087, have not yet reached commercial production.

Tests at the Missouri Station indicate no practical difference between 04730 and 19284. Also 12087 and 17291 appear practically similar. There are two major differences between 04730 and 12087. A more erect and coarser stem, with fewer branches, is produced by 04730. This strain also blooms and matures seed one week to ten days earlier than does 12087, but since *sericea* is perennial in growth from year to year, and thus does not depend on seed production to continue its stand, the earlier maturing of 04730 is not practically important except to the seed grower. Both strains, after they have been established one year, will mature seed safely in most seasons, except possibly in the northern fourth of Missouri. In good stands from broadcast seedings there should be no great difference in quality between the two strains.

The Missouri Experiment Station is testing a number of newer introductions of *sericea* together with some of its own selections from this species. These may not grow as large as the varieties now in use, but they are sufficiently early to mature seed safely even farther north and west than Missouri. A few of these strains are two to three weeks earlier than Korean *lespedeza*. Their value compared with that of 04730 and 12087 has not yet been fully determined.

Growth Habits of *Sericea*

Sericea develops a deep taproot which branches profusely and spreads downward and laterally. The roots penetrate even the very tight, heavy clay subsoils commonly found in Missouri. In fact, the plant when once established seems better adapted to flat, poorly drained prairie soils than to better drained land with an open

subsoil. In this respect sericea is in direct contrast to red clover, sweet clover, and especially alfalfa. A good stand should last indefinitely, outliving a field of alfalfa on good land and under the best management.

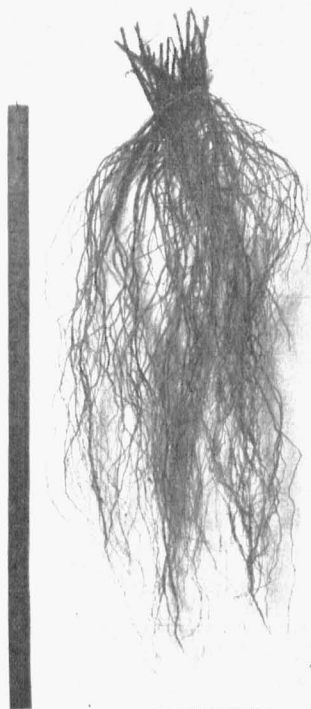


Fig. 1.—The picture shows a yard-long growth of sericea roots in two years.

Sericea sown broadcast, either alone or with a small grain, uses practically the entire first season in developing a root system, and unlike alfalfa, sweet clover, or red clover, makes a relatively small top growth. This is a significant point in connection with its method of production and utilization. In the second season the plant reaches practically its maximum top growth. If started in a heavy growth of small grain, especially during dry weather, the sericea may be so retarded as to require two full seasons to reach its maximum size. If the crop is sown thinly in rows, cultivated, and kept free of weeds (a method commonly followed in seed production) a practically full growth is obtained by late August.

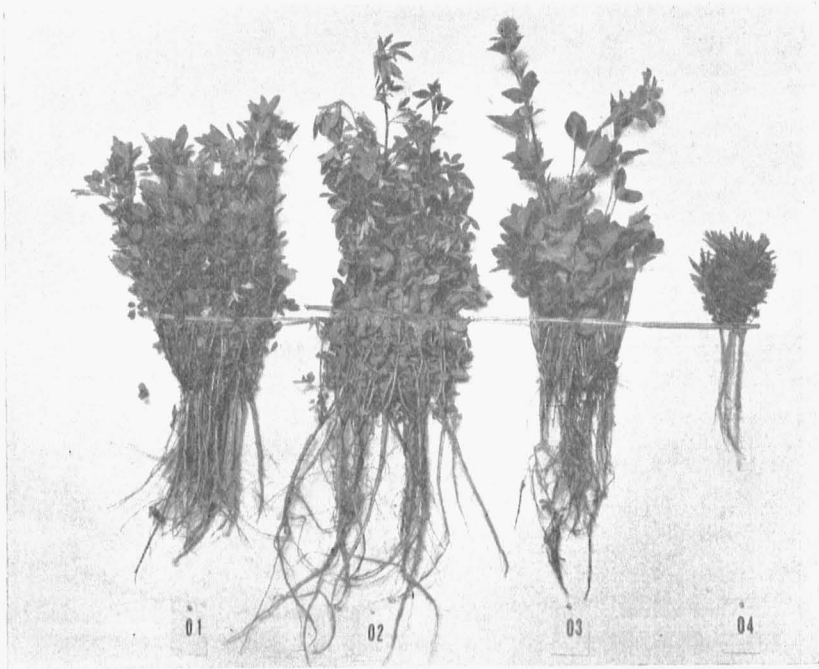


Fig. 2.—From left to right the first season growths of alfalfa, sweet clover, red clover and sericea are shown. The specimens were from crops sown on April 10 and photographed eighty days later. Sericea sown broadcast grows very slowly in the first season.

Beginning with the second season the sericea crop, either rowed or broadcast, though slow to start in the spring, develops rapidly from the first of May, and by the first to the fifteenth of June is high enough to cut for hay.

Sericea sown alone in the spring and subjected to heavy competition from grass and weeds during the first season, will usually not reach maximum size until the third year. Again, a crop sown on winter barley will make considerably more growth following barley than it would have made following wheat. This is true because barley does not retard the first year's growth of sericea to the degree that wheat does. Sericea is like Korean lespedeza and unlike alfalfa, sweet clover, and red clover, in its high resistance to the crowding growth of any grain crop with which it is sown.



Fig. 3.—The October growth of a sericea stand sown on winter barley last spring is shown here. Sericea sown broadcast, whether alone or with grain, requires one season in which to establish itself.

Also the young stand of sericea, sown alone, will survive in the heaviest growth of weeds and grass. This ability to compete strongly with associated growths gives sericea an important advantage in the establishment of a stand.

Soil Requirements

Lespedeza sericea is suited to a comparatively wide range of soils. It is similar to Korean *lespedeza* in this respect and unlike alfalfa, red clover and sweet clover. Apparently it does not respond to an application of lime, even on very sour soils. It produces normal growth on soils much too low in fertility for red clover. There are indications that on soils extremely low in fertility *sericea* may not be found valuable. However, when more is known about this plant and the best methods for its production, the very poorest land may be found capable of supporting a useful

growth. On average soils, the better the land in natural fertility the better the sericea. In this respect sericea and Korean lespedeza are alike.

In a limited test the growth of sericea was increased by phosphate fertilizer, but was not affected by other kinds of fertilizer nor by lime. The whole question of fertilizing the sericea crop will require a thorough study on various soil types before recommendations for local practice can be made.

Drought Resistance

Sericea is extremely drought resistant, largely because of its deep and extensive development of roots. Wherever established in Missouri it has been found fully as resistant as Korean lespedeza, to summer drought and more resistant than sweet clover, red clover, or alfalfa.



Fig. 4.—The late June growth of sericea drilled without a nurse crop in April of the previous year is shown in the picture. That part of the crop on the left has just been cut for hay and yielded 2030 pounds per acre.

Comparison of Lespedeza Sericea and Korean Lespedeza

Sericea is a long-lived perennial, Korean is an annual. Sericea roots live through the winter, producing new plants from buds developed just below the ground level. It will produce a heavy seed crop after the first season, which may be allowed to shatter in order

to maintain a stand should winter killing of the roots occur. Korean naturally comes each spring only from a heavy seed crop ripened in the previous fall.

Sericea coming from the roots each spring starts growth at about the same time Korean starts from seed. Having roots fully developed it grows more rapidly, however, and on average soils will produce a growth of 12 to 18 inches by the 15th of June, as compared to 3 to 6 inches of Korean growth at that time.

Red clover, alfalfa, and especially sweet clover, start much earlier in the spring than either sericea or Korean, and make much more rapid growth than sericea during the cool weather from February to May. By the first of May alfalfa and sweet clover will have developed three to four times the growth of sericea. By the middle of June the difference is not so great, owing to the faster growth of sericea during late spring.

Cold Resistance

Sericea was introduced from an Asiatic climate much like that of Missouri. Properly produced and managed it should therefore survive our winter seasons. Established stands of sericea are not likely to be lost because of low temperatures during the winter months. Broadcast seedings of sericea have survived temperatures of 15° below zero with little or no snow for protection. On our experiment field near Green Ridge, Pettis County, no winter killing occurred when the crop growing on a flat, tight, poorly drained soil was subjected to a temperature of 12° below zero. The results were similar on the Ozark experiment field in Crawford County. At the Experiment Station in Columbia sericea suffered only a trace of winter killing at temperatures ranging to 17° below zero.

The stand is more likely to be damaged by a late spring freeze than by excessively low winter temperatures. The new growth in the spring comes from buds at the base of the stems from one-half to three inches below ground. These buds, developed during late summer and early fall, pass through the winter in a dormant condition and produce new growth during the season which follows. Winter killing is prevented by the protection of the buds until all danger of severe freezing weather is past. A warm period during late January or February may start the buds in growth. A later freeze may be severe enough to reach and destroy them. Such conditions will determine the damage to a stand of old plants.

During the winter of 1932-33, sericea planted in rows for seed and kept free of weeds, was damaged excessively throughout Mis-

souri and in Illinois and Kentucky. Examinations during December, January and early February indicated that no damage had occurred to the roots, either in rows or broadcast seedings. During



Fig. 5.—From left to right the specimens shown in the picture are sweet clover, sericea, and red clover. Their stages of growth in the middle of April, about one year after sowing, is indicated. Note the new buds coming from the sericea stubble.

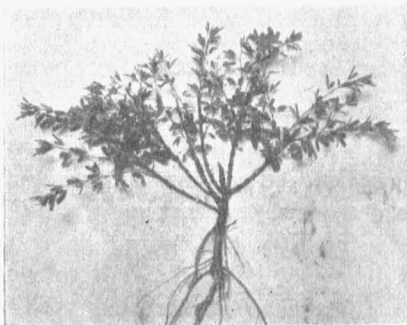


Fig. 6.—Note first in this picture the central stub which shows where the sericea plant was cut for seed in October after being sown in April. This spring the plant produced six branches, all coming from the main stalk below the ground. The stand represented by this plant furnished a hay crop in late June. The second growth shown here has developed from new buds on the branches but not from further branching of the main stem.

mid-February, however, a warm period started the buds on plants grown in rows. In March a severe freeze caused heavy winter killing of sericea planted in rows and unprotected by grass or stubble. In all cases adjoining fields of broadcast sericea showed only a trace of this damage.



Fig. 7.—Sericea sown in rows is easily killed by heavy freezing in late spring. Note the new growth from seed shattered in the previous fall.

Sericea growing on heavy soils with a hard pan near the surface does not heave badly during winter months, even under conditions which cause severe heaving in alfalfa, sweet clover, and red clover.

Seedbed Preparation and Seeding Practices

Sericea must be sown shallow on a firm seedbed.

From information thus far obtained, it seems advisable to sow scarified seed in the spring. There are indications that on some soils better results will be obtained from seed sown in the hull in the fall, after the first of October. There is not enough information, however, on the success of fall seeding in the hull to warrant a general recommendation. For the present, spring seeding with scarified seed is the safest known method for obtaining good stands.

Since shallow seeding on a solid seedbed is an *essential practice*, and since broadcast sericea cannot be expected to produce much returns the first season, the best method is to prepare and seed the ground to wheat, rye, or winter barley to be used as a nurse crop for sericea the following spring. Ground prepared in this manner is firm and compact on the surface. Any attempt to prepare the land in the spring will usually not make as firm a seedbed surface as is required by the crop. Again, when the seedbed is prepared in the spring there is danger of sowing the seed too deep. It is highly important to sow the seed shallow.

Stands of sericea are easily affected by a crust formed on the soil surface after seeding. A very thin crust, especially if the seed has been sown rather deep, removes nearly all chances of obtaining a stand.

For spring seeding on land established to small grain during the previous fall, the crop may be broadcast or sown through a clover-grass attachment on a grain drill. Drilling is the best method since a more even distribution and a better controlled depth of seeding are obtained. Nothing is to be gained from seeding too early. Late March in south Missouri, April 1 in central Missouri, and April 10 in north Missouri are safe dates of seeding.

If the field is dry at seeding time, harrowing the land is desirable before sowing broadcast. If the ground is wet and alternate freezing and thawing prevail, no covering is necessary. When the seed is sown through a clover-grass attachment the channels leading from the attachment should be left in place so that the seed will be carried down through the drill. With the disk forced firmly against the ground the seed is thus deposited in shallow furrows.

Not less than 20 pounds, and preferably 30 pounds, of scarified, inoculated seed should be broadcast per acre. When unhulled seed is sown in the fall 25 to 35 pounds should be used.

Sericea For Hay

There is a tendency for sericea to develop woody stem growth, especially if the stand is thin or the crop is allowed to reach the bloom stage before harvest. For this reason the crop should be cut more frequently for better quality. But the second and succeeding growths do not develop as rapidly as does alfalfa or red clover. Too frequent cutting, therefore, though improving the quality, may reduce the total growth and yield during the season.

In Missouri one hay crop and a seed crop, or two hay crops, can usually be obtained in one season. When two hay crops are

to be harvested, the first should be taken by June 15, for good quality and yield. The second crop, if left to mature, will usually produce a fair to good seed yield in a normal season. If the second crop is to be used for hay, it should be cut by August 25. This will give good quality in the second cutting and permit enough growth before frost to store up reserve food material in the roots, and to afford winter protection as cover. When sericea is desired for both hay and pasture, the first crop should be cut in June for hay, and the second growth pastured during the summer.

Good stands of sericea cut and properly cured give a quality of hay equal to alfalfa or red clover in appearance. According to analyses by the U. S. Department of Agriculture, sericea hay is somewhat inferior to alfalfa in feed value. The quality of the hay and the percentage of fiber can be controlled somewhat by the time of cutting and by handling the cured hay to avoid loss of leaves.

Sericea cures rapidly after cutting. It should be carefully handled or the value of the cured hay may be materially reduced through the loss of leaves. An average growth in good curing weather should be raked in windrows and placed in small shocks within a very few hours after cutting. One should not attempt to cure the crop in the swath. A crop of sericea may be stored or baled after cutting, two or three days earlier than red clover or alfalfa.

Sericea Seed Production

Sericea sown in rows and kept free of weeds and grass will produce a seed crop the first season. The cost of keeping the crop free of weeds is too great, however, to warrant the practice with normal prices for the seed. The difficulty of harvesting the rowed crop also adds to the cost of seed production. A more practical seed production is obtained by starting the crop through broadcast or drilled seedings cutting early for hay, and allowing the second growth to make seed; or allowing the crop to grow during the entire season for seed. Although the second growth will usually make less seed where a cutting has been harvested, a more uniform seed maturity is obtained and the crop is more easily cut and handled.

When the seeds near the tips of the growing plants are firm and before they are brown, the crop is ready to cut. Whether the first or second growth is used for seed, the crop is best harvested for seed with the ordinary grain binder. The bundles should not be tied too tight and should be bound rather low. Use not more than six bundles to the shock. The crop is best threshed with the ordinary grain separator set to thresh wheat with the air reduced so as not blow over the seed.



Fig. 8.—These shocks of sericea seed represent a part of the crop shown in Figure 4. The shocks near the fence were produced from a part of the stand cut for hay, and yielded 210 pounds of seed per acre. The shocks on the right represent a full season growth for seed, and produced 280 pounds per acre. The crop was grown without soil treatment on a piece of flat, poorly drained, sour land in Southwest Missouri.

Sericea For Pasture

Farm animals do not graze sericea as readily as they graze Korean lespedeza, alfalfa, or red clover. The growing crop contains from five to nine per cent tannin, which may partly explain why the animals do not at first graze the plant readily.

On the Green Ridge experiment field a small acreage of sericea was grazed with dairy cows during the season of 1933. The crop, coming from a broadcast seeding, was two years old and about 7 inches high. The cattle were turned into the field on June 15, from good sweet clover pasture. During the periods of pasturing the cows were held in a dry lot from 7 p. m. to 7 a. m., running on the sericea during the day. For the first three to four days they showed distaste for the crop, but later seemed to find it palatable.

The milk flow while stock were on the sericea remained constant and equal to that from sweet clover. After the cows ran on poor permanent pasture for several days, with a corresponding drop in milk flow, their milk production came up to normal soon after they were returned to the sericea.

During the 106 days from June 14 to September 28, the sericea without any soil treatment provided 200 cattle days of pasture per acre. A field of excellent second year sweet clover sown on heavily limed and fertilized land provided 299 cattle days per acre in the 105 days from April 11 to July 25.

Expected Place of Sericea

Several years of careful investigation will be necessary before the possibilities and usefulness of sericea can be fully established. There are indications that sericea, when once the best seeding and management practices have been fully determined, will find a useful place on Missouri farms as a hay crop or for a hay-pasture combination. It is not likely that sericea as a pasture plant can replace Korean lespedeza on the medium to poor soils. Nor can sericea for hay possibly compete with alfalfa on land well suited to alfalfa. Sericea will not replace red clover for hay on soils where red clover is well adapted, because stands of sericea are not as easily obtained as red clover; and sericea, a long-lived perennial, is not especially suited to cropping systems.

A restricted acreage of good land is adapted to the economical production of alfalfa in Missouri. The sweet clover acreage is small because of low fertility and the acidity of much of the land where the crop is needed. Stands of red clover are uncertain even on the better land, because of the probability of hot, dry weather,



Fig. 9.—The late June growth of a mixture of Lespedeza sericea and Korean lespedeza is shown at the hay stage of the sericea. It was started in the spring of the previous year by drilling sericea on a thin stand of Korean. The mixture is valuable in furnishing an early summer hay crop and pasturage for the remainder of the season.

and on many soils types red clover cannot be grown with certainty following even an expensive soil treatment.

It is for the vast area of cultivated land classified as medium good to medium poor that sericea as hay and as a soil building crop holds the greatest promise. On such land it will thrive without soil treatments. On the productive soils it will not be able to compete with alfalfa, red or sweet clover. On the very thin worn soils it will perhaps not grow well enough to be used extensively for hay. And it will not anywhere be as satisfactory as Korean lespedeza for pasture.

There are indications that a sericea-Korean combination may be utilized effectively on soils of medium fertility. It would be sown as a mixture in the spring on small grain. The Korean could be pastured the first season. Beginning with the second year a hay crop, mostly sericea, would be harvested during the early June and the field pastured during the remainder of the season. Sericea, being perennial, would renew a stand each year from the roots. The Korean under pasturing after July 1 would reseed itself each season.