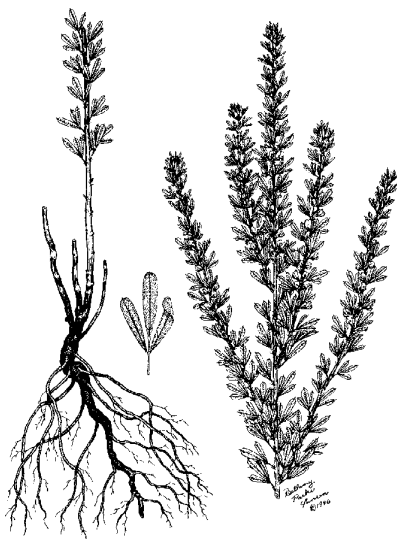


# Sericea Lespedeza: History, Characteristics, and Identification

*Sericea lespedeza* (*Lespedeza cuneata*), or Chinese bush clover, is an introduced perennial legume native to eastern Asia (Figure 1). It is recognized for its tolerance of drought, acidity, and shallow soils of low fertility. It will tolerate soils ranging from very acidic to slightly alkaline, but is best adapted to a pH of 6.0 to 6.5. It does best on clay and loamy soils that are deep, fertile, and well drained, but will also grow on poor sites. It has few insect and disease problems. *Sericea lespedeza*'s ability to thrive under a variety of conditions and its tendency to crowd out more palatable forages are among the reasons it has been declared a noxious weed in Kansas and may be considered as a noxious weed in Missouri, Nebraska, and Oklahoma.

*Sericea* was planted in the past to control soil erosion, provide forage for livestock, and provide cover and food for wildlife. From these plantings, it has spread by animals and movement of hay contaminated with *sericea* seed to native prairies, shrublands, forests, and introduced pastures. Normal management practices such as grazing, burning, and applying herbicides do not adequately control *sericea lespedeza*.



**Figure 1.** *Sericea lespedeza* plant showing the leaf (center), lower stem and root system. (Drawings courtesy of Oklahoma State University).

## History

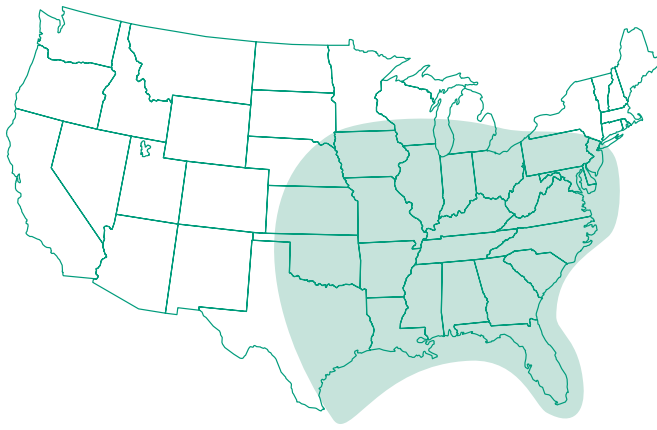
*Sericea lespedeza* was first planted in the United States in 1896 by the North Carolina Agricultural Experiment Station. Little study or use of *sericea lespedeza* was done until 1924 when the USDA secured seed from Japan and planted it at the Arlington Experiment Farm in Virginia. Its perceived value at the time for erosion control, hay, wildlife cover and food, and seed production was generally accepted. *Sericea* was first used as a protective cover for sites with poor soils. It was not widely used for pasture until the late 1940s. *Sericea lespedeza* is adapted to climatic conditions extending from Florida to Texas, north to Nebraska, and east to the Atlantic Coast, through the states of Michigan and New York (Figure 2). It grows best where annual precipitation is 30 inches or more and has survived winter temperatures of  $-17$  degrees Fahrenheit.

Two varieties of *sericea* were developed for improved forage quality and nematode resistance. These varieties were used on highway rights-of-way, dams, and waterways. In the 1930s it was planted on strip-mined land in southeast Kansas and Missouri. Additional plantings for wildlife habitat in Kansas occurred around state and federal reservoirs from the



### Team Sericea Lespedeza

This publication was cooperatively developed under the Multi-State Sericea Lespedeza Work Group, a coalition of agencies and organizations in Kansas, Oklahoma, Missouri and Nebraska.



**Figure 2.** Range of *sericea lespedeza* in the United States.

1940s through the 1970s. It also was used in the 1950s with introduced grasses and in Soil Bank plantings. Recent introductions of the plant occurred while establishing native grass on Conservation Reserve Program (CRP) acres, a provision of the 1985 Farm Bill. Native grass seed harvested from rangeland and used in CRP plantings often contained *sericea lespedeza* seed. *Sericea lespedeza* was not widely recognized as a potential weed at that time.

*Sericea lespedeza* was introduced into Missouri and other southern states during the 1930s. It was planted on roadsides and for forage. It appears to be moving into Nebraska from Kansas, particularly in the southeast part. It also was planted in Nebraska during the mid to late 1970s for wildlife food and cover. Oklahoma has planted *sericea* for several uses over the years.

### Current Status In The Midwest

**Kansas.** *Sericea lespedeza* is most common in the eastern third of Kansas but has spread westward through the CRP program, with more than 73 counties reporting occurrence. It was declared a “county option” noxious weed in late 1988. The legislature declared it a statewide noxious weed July 1, 2000. *Sericea lespedeza* is the first federally listed forage crop to be declared a noxious weed. Based on the 2006 inventory conducted by the Kansas Department of Agriculture, Kansas had 598,000 acres identified with *sericea lespedeza*.

**Missouri.** *Sericea lespedeza* is found throughout the state, probably in every county. Citizens are becoming increasingly aware of the extent and rate of spread of *sericea lespedeza*. Public awareness campaigns and promotion of existing control methods are planned.

**Nebraska.** *Sericea lespedeza* has been identified in about eight counties in southeast Nebraska. Wildlife managers are currently addressing *sericea lespedeza* on public lands. Private landowners have begun control efforts in many areas. Efforts are under way to identify infestations and conduct an aggressive public awareness campaign.

**Oklahoma.** *Sericea lespedeza* has been found growing in all parts of Oklahoma, except the Panhandle. *Sericea* uses water less efficiently than many other warm season plants and does best when annual precipitation is 30 inches or more, which explains why it is a greater problem in eastern Oklahoma. However, *sericea* has been reported on Conservation Reserve Program (CRP) lands and rangelands in western Oklahoma.



**Figure 3.** The flowers of *sericea lespedeza* are borne in the axils of the leaves.



**Figure 4.** The seed of *sericea lespedeza* is small.

### Identifying *Sericea lespedeza*

*Sericea lespedeza* is a shrubby, deciduous perennial about 2 to 5 feet tall. Coarse stems are single or clustered with numerous branches. New growth each year comes from buds located on the stem bases or crown about 1 to 3 inches below ground. Stems and branches are densely leaved. Leaves are trifoliate and attached by short petioles. Leaves are club- or wedge-shaped (wider at the tip than the base),  $\frac{1}{4}$  to 1 inch long, and  $\frac{1}{16}$  to  $\frac{1}{4}$  inch wide. The leaf is round to flat at the top, with a conspicuous point at the tip. The lower leaf surface has silky hairs. Scale-like stipules are present on the stem.



**Figure 5.** Slender lespedeza plant (left) showing the leaflet shape (center), lower stem and root system. (Drawing courtesy of Oklahoma State University).

Flowers are yellowish-white with purple to pink markings and appear from mid-July to early October. The flowers occur in clusters of 1 to 3 in the upper leaf axils and are  $\frac{1}{4}$  inch long, fused at the base (Figure 3). Seeds are  $\frac{1}{16}$  to  $\frac{1}{8}$  inch long and tan or greenish in color (Figure 4).

*Sericea* is often confused with desirable native legumes. Several species of lespedeza occur in the Midwest. All are perennial except Korean and common lespedeza. These two annuals also are introduced and commonly used in tamegrass pastures. They are considered valuable forage in southeast Kansas, southern Missouri, and northeast Oklahoma. Native perennial lespedezas in the Midwest include roundhead, violet, and slender lespedeza. None of these species has shown the invasive nature of *sericea lespedeza*. Slender lespedeza is the easiest to confuse with *sericea lespedeza*. Slender lespedeza has the same tall, coarse, branched stems as *sericea lespedeza* but has different-colored flowers and a different leaf shape. Flower color of slender lespedeza ranges from purple to pink, and the leaves are linear or elliptical with both a rounded tip (without a conspicuous point) and base (Figure 5).

### Competitive Characteristics

*Sericea lespedeza* is relatively slow to establish, having a rather weak, vulnerable seedling stage. *Sericea lespedeza* tolerates shade quite well, establishing in dense shade where direct sunlight does not reach during the day.

Germination and seedling growth are regulated by day length and temperature. Growth increases as day length exceeds 11 hours with maximum seedling growth at 13 to 15 hours of day length. Optimum temperatures for germination and growth range from 68 to 86 degrees Fahrenheit.

During establishment, *sericea lespedeza* uses most of its energy producing a root system. It has a deep woody taproot producing numerous branches that spread laterally and downward to a depth of 3 to 4 feet. Finer, more fibrous roots also are produced. This extensive root system helps make *sericea lespedeza* competitive and somewhat drought resistant.

*Sericea lespedeza* has been found growing in ditches, fence rows, or pastures without invading adjacent well-managed rangeland and pastures. It appears to establish best where competing vegetation is very short, and light is allowed to reach the germinating seed and seedlings. Many legumes need good exposure to sunlight during the seedling stage, which is the situ-



ation found in a burned pasture. Burning is assumed to enhance establishment, possibly due to more sunlight available to the seed and seedlings and scarification. Seedlings will germinate and survive at low population levels where ground cover and other plant competition is dense. Examples of such areas include fence rows, brushy and grassy areas, and where fire and grazing have been excluded for years.

Established sericea lespedeza plants will reduce or eliminate competing vegetation. When sericea lespedeza becomes established, it restricts the amount of light reaching other plants. Its tall, upright growth with multiple branches and dense foliage produces heavy shading. Cool-season grasses, such as Kentucky bluegrass, are better able to survive such shading. Warm-season grasses, such as big bluestem, may survive some shading but will be weak and produce little forage unless the shading is removed.

The photosynthetic rate of sericea lespedeza is only half that of alfalfa. Sericea requires more water to produce foliage than other warm-season plants, creating a “drought” for competing vegetation. In addition to competing for light, water, and nutrients, sericea plants also produce allelopathic chemicals, which inhibit seed germination and growth of some plants, such as big bluestem, Indiangrass, Kentucky bluegrass, bermudagrass, fescue, and ryegrass. These chemicals are released from the roots and leached from other plant residues, chiefly leaves.

Sericea lespedeza is a legume but has a low nitrogen fixation rate and has little effect on the status of soil nitrogen. It has been shown to increase the nitrogen content of associated grass, but what nitrogen is supplied is offset by the allelopathic substances produced. Grass shoots exposed to allelopathic substances have lower nitrogen content, resulting in reduced forage quality. Nitrogen fertilizer is required to maintain production of introduced forage grasses grown in mixtures with sericea lespedeza.

Sericea lespedeza is a prolific seed producer. Individual stems may produce in excess of 1,000 seeds, with 300 to 850 pounds of seed produced per acre. There are about 350,000 seeds per pound. Most sericea lespedeza seed is hard with normal germination rates of only 10 to 20 percent. The seeds are nearly impervious to water so they must be scarified to enhance germination. No data is available on how long seed can remain viable in the soil, but it is expected that it will be 20 years or longer.

## Forage Quality

Sericea lespedeza has been recognized as quality forage due to its high levels of crude protein. High tannin concentrations significantly reduce beef cattle grazing of sericea lespedeza. Livestock do not like to graze sericea lespedeza high in tannins. High levels of tannins cause sericea lespedeza to be unpalatable and reduce intake and digestibility. Tannins bind with proteins, causing them to be unavailable for digestion. The level of tannins appears to increase with maturity of the plant, high air temperatures, and low rainfall. The tannins also reduce insect feeding.

Livestock readily consume hay containing sericea lespedeza, since field drying decreases the tannin concentration. Cattle will graze sericea lespedeza mainly early in the growing season, under management-intensive grazing, or intensive early stocking. Seeds and flowers also are eaten during early fall. Grazing potential is improved if a spring burn has removed the previous years' growth. Sheep and goats will more readily select and consume sericea lespedeza than cattle.

## Wildlife Considerations

Sericea lespedeza was originally considered valuable as food and cover for wildlife. This has not been supported by research or practical experience. Deer will utilize sericea lespedeza that is kept short by mowing or grazing. They also will use sericea lespedeza as browse in winter, but their role in its spreading is unknown. Quail may consume the seeds in fall and early winter, but the energy content of the seeds will not sustain quail through adverse weather conditions. Seeds have also been found in the stomachs of cotton rats. Sericea lespedeza probably holds its greatest wildlife benefit as a source for cover. Quail will roost and rabbits will hide in it. Annual weeds provide good roost cover, and blackberry brambles provide escape cover without invading as aggressively. In addition, sericea deters other plant species from developing, which reduces the diversity of plant foods and additional cover needed to support wildlife.

## Control

The best approach to control is early detection, isolation of infested areas, and control of individual plants with approved herbicides. Once established, an integrated approach to control will be necessary to minimize the damage with the primary goal to reduce seed production every year. Conventional management

practices of grazing and prescribed burning have not been effective in preventing the spread of sericea.

It is difficult to give grasses a competitive edge over sericea with season-long and rotational grazing because cattle will select grasses and leave the sericea plants. If grasses are heavily grazed, the invasion of sericea will be hastened. Spring burning removes the dead growth of sericea, but has no negative effect on established plants. Fire increases seed germination, thus promoting the establishment of new plants. However, burning can improve the effectiveness of herbicides if applied to regrowth the same year.

Mowing will reduce the vigor of sericea plants if cut close to the ground multiple times each year. Plants should be mowed each time they reach a height of 12 to 18 inches. The most damaging time to cut sericea is late in the growing season when the plants are trying to build root reserves for next year's growth. Mowing will not kill sericea and may damage desirable grasses, depending on timing and frequency of cutting. In addition, a large sericea seed bank will remain in the soil, ready to germinate when conditions are suitable. No herbicides have been labeled for seedling control.

Very few herbicides for broadleaf weed control have provided good control of sericea lespedeza. Sericea has not been controlled with 2,4-D, and minimal kill has been achieved with a combination of picloram (Tordon 22K™) and 2,4-D (Grazon P+D™) or dicamba and 2,4-D (Weedmaster™). However, excellent control of sericea has been obtained with tryclopyr (Remedy™) applied in June and July, and metsulfuron (Ally™ or Escort™) applied in September. **Always read and follow label instructions and cautions.**

Grazing with meat goats has been used to reduce the production of seed. Stocking rates must be maintained at levels that will keep the sericea lespedeza grazed below a 3- to 4-inch height. Cattle can be stocked at the same time, adjusting the stocking rate to compensate for the reduced grass production due to sericea lespedeza competition.

A combination of grazing management, burning, mowing, and applying herbicides offers the most effective control of sericea lespedeza. An example of how an integrated program might work is:

1. Use light or moderate stocking, allowing fuel to accumulate for a prescribed burn.
2. Burn in spring to encourage germination of sericea seed, to remove new sericea lespedeza growth, and remove all dead growth.
3. After fire, intensively graze areas until no later than mid-July.
4. Apply an approved herbicide in 4 to 6 weeks after grazing ends.
5. Apply an approved herbicide in September to areas missed by the earlier treatment.
6. During September and October, exclude livestock from areas where sericea stands are producing seed to prevent grazing, which can spread the seed.
7. Thereafter, spot treat sericea with an approved herbicide as needed.

*Always check with local extension offices, USDA-NRCS, or similar offices for the latest approved herbicide and other controls.*

## Summary

Sericea lespedeza was introduced into the United States in the 1930s but was not considered a problem until the 1980s. Its highly competitive and invasive nature, together with low palatability, makes it undesirable on rangeland, introduced cool-season pasture, native warm-season grass plantings, and roadsides. Sericea lespedeza can be distinguished from other lespedezas by its leaf shape and flower color. The trifoliate silky leaves are wedge-shaped, and flowers are white to cream-colored with a purple throat. Early identification and prevention of seed production are essential for long-term management and control. An integrated approach to control, using grazing management, burning, mowing, and applying herbicides, offers the greatest success.

**Paul D. Ohlenbusch**  
Former State Leader, Extension Agronomy  
Grazingland Management  
Kansas State University

**Terry Bidwell\***  
Professor  
Rangeland Ecology and Management  
Department of Plant and Soil Sciences  
Oklahoma State University

with contributions from

**Walter H. Fick**  
Range Scientist  
Department of Agronomy

**Gary Kilgore**  
Crops and Soils Specialist  
Southeast Area

**William Scott\***  
State Weed Specialist  
Plant Protection and Weed Control Program  
Kansas Department of Agriculture

**Jeff Davidson**  
Agriculture Agent  
Greenwood County

**Steve Clubine\***  
Grassland Biologist  
Missouri Department of Conservation

**Jim Mayo**  
Associate Professor  
Department of Biological Sciences  
Emporia State University

**Mitch Coffin\***  
Program Manager  
Nebraska Noxious Weed Program  
Nebraska Department of Agriculture

\*Members of the Muti-State *Sericea Lespedeza* Work Group Advisory Board

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