MISSISSIPPI STATE UNIVERSITY EXTENSION

# Lespedeza Types Used as Forage Crops in the Southern U.S.

Annual and perennial lespedezas are the forgo season legumes that can offer a lot of benefits in forage systems across the southern United States. Production acreage has declined significantly in the last 20 years. Lespedeza is a deep-rooted legume that can be established successfully in cultivated areas as well as in marginal (eroded and depleted) soils. It is tolerant to drought and low soil pH and does not cause bloat. It has a lower yield potential than other forage legumes; however, lespedeza responds well to both lime and fertilizer, especially potassium and phosphorus. Lespedeza can be used as a forage crop for grazing, hay, or soil stabilization (erosion control and land reclamation) (Figure 1). Compared to other popular legumes, such as clovers, lespedeza is a little-known forage. Three species of lespedeza are well-suited for production in Mississippi: sericea, striata, and Korean.


**Figure 1. Seed size (A), seedling emergence (B), grazing utilization (C), and biomass production (D) of sericea lespedeza.**

Lespedeza is usually established as a pure stand or as a companion legume with cool- and warm-season perennial grasses. The seeding rate varies with the type of lespedeza being used (Table 1). When seeding into a warm-season perennial pasture, broadcast or drill seed in late summer or early spring. Adjust seeding rates accordingly if germination is less than 85 percent. If the seed is not pre-inoculated, inoculate the seed with the recommended rhizobia strand (*Bradyrhizobium* spp., EL type inoculant).

Seed can be broadcast into bermudagrass or bahiagrass pasture in late fall or in mid-April to mid-May. Disturbing the existing sod with a light disking before broadcasting can increase seed-to-soil contact and improve stand establishment. It is best to use a no-till drill. During establishment, it is recommended to minimize spring nitrogen application to reduce grass competition. Lespedezas can make excellent hay. Cut when plants reach 30 percent bloom or 12–15 inches

**Table 1. Common characteristics of three types of lespedeza.**

**Annual**

| Lespedeza type | Approx. # seeds/ lb | Seeding rate (lb/ ac) | Seeding depth (in) | Emergence time (days) | Palatability | Drought tolerance |
|---|---|---|---|---|---|---|
| Korean | 238,000 | 25–30 | ¼–½ | 14–18 | high | fair |
| Striata | 200,000 | 30–35 | ¼–½ | 14–18 | high | good |

**Perennial**

| Lespedeza type | Approx. # seeds/ lb | Seeding rate (lb/ ac) | Seeding depth (in) | Emergence time (days) | Palatability | Drought tolerance |
|---|---|---|---|---|---|---|
| Sericea | 372,000 | 12–15 | ¼–½ | 15–30 | medium | excellent |

in height. Regrowth occurs from the buds in the crown of the plant, so leave a 3- to 5-inch residual height. Pure stands of lespedeza can produce 1–4 tons of dry matter per acre.

There is a misconception that sericea lespedeza can be "invasive" and unwanted in some ecosystems such as native grasslands. However, a grazing management strategy can reduce its spread by preventing the plant from making seed. Under field conditions, lespedeza does not reproduce vegetatively by roots (rhizomes or stolons) or stem cuttings. Some suppression of sericea has been observed after mowing or burning followed by intensive early stocking with stocker cattle. Lespedeza cannot be grazed or clipped frequently. Grazing should begin when the plant has reached 12 inches and stop at 4 inches stubble height.

Several diseases and pests can cause great losses in lespedeza. Korean lespedeza cultivars are most susceptible to bacterial wilt. Rhizoctonia, powdery mildew, and southern blight are sometimes serious in southern states. Root-knot nematodes can damage annual lespedeza in sandy, Coastal Plain soils. Lespedeza is also a favorable host to other nematodes such as soybean cyst, tobacco stunt, and sting nematode. Although insect damage could be light in lespedeza, insects such as grasshoppers, armyworms, and alfalfa leafhoppers can impact yields and forage quality.

# Types of Lespedeza

## Annual

Annual lespedezas are fine-stemmed, leafy legumes with shallow taproots. Both annual and perennial types grow in a soil pH range of 4.5–7.0. They are short-day legumes that begin flowering in late August and set seed in mid-September to mid-October. When managed properly, annual lespedeza can re-seed itself. Annual lespedeza is more productive in late summer (July to mid-October) and can complement perennial warm-season grasses to improve yield and forage quality.

Flower color in annual lespedeza species range from purple to light pink. Plants can grow to a height of 2–3 feet. Pods contain a single seed that is blue to black and may or may not be mottled. Annual forage production of annual lespedeza in a hay system with low fertility can range from 1 to 2 tons per acre. However, with adequate rainfall and higher soil fertility, yields can exceed 4 tons per acre. Hay can be harvested once or twice a year, with the first cut in mid- to late July when the lower leaves begin to senesce (turn yellow) and the second at first bloom. Crude protein ranges from 12 to 15 percent.

One advantage of annual lespedezas is that, after they are well-established, they can be used in a double-cropping system with annual ryegrass or small grains (wheat, oat, cereal rye, or triticale). In this type of system, ryegrass should be seeded at no more than 15 pounds per acre and other small grains at no more than 60 pounds per acre.

Striata lespedeza *(Kummerowia striata)* is also known as common lespedeza or Japanese clover. Seeds are produced where the leaves join the main stem and have a blotched color. Hairs on the stems of striata lespedeza point downward, while hairs on Korean lespedeza point upward. Striata flowers later than Korean lespedeza, and seed production could be reduced by cool temperatures. Varieties include common, Kobe, Marion, and Legend. Kobe is the most common variety on the market. Varieties of this species are high seed producers that re-seed well in pastures. Striata lespedeza has a prostrate growth habit, which makes it better suited for grazing than hay production.

Korean lespedeza *(Kummerowia stipulacea)* tends to have more upright growth and wider, indented and heart-shaped leaflets. It has distinct veins and flowers earlier than striata. The leaves of Korean are broader and the stipules larger than those of striata. Seeds are produced at the ends of branches. Seeds are black and shiny. Korean lespedeza is less tolerant of acid soil and more tolerant of alkaline soil than striata lespedeza. It is adapted to well-drained clay or loamy soil. It is well-suited for hay production because of its upright growth. Summit is the most common Korean-type lespedeza. The three cultivars of Korean are Climax, Harbin, and Rowan.

## Perennial

Sericea lespedeza (*Lespedeza cuneate*) is the only perennial species used for forage production. This species is drought-resistant and can tolerate shade, but it is not well adapted to poorly drained soils. Sericea lespedeza is a shrubby plant that is about 2–5 feet tall. The stem is gray-green, coarse, and single or clustered with several branches. Leaves are trifoliate, club or wedge-shaped, and attached by short petioles. The lower leaf surface has silky hairs. Scale-like stipules are present on the stems. Flowers are yellowish-white with purple to pink markings and appear from mid-July to early October. The flowers occur in clusters of one to three in the upper leaf axils and are ¼ inch long and fused at the base.

Sericea lespedeza is slow to establish with a rather weak seedling stage and should be planted at a rate of 12–15 pounds per acre in a pure stand. It can grow from May to September. Germination and seedling growth are regulated by day length and temperature. Growth increases as day length exceeds 11 hours; maximum growth occurs with 13–15 hours of daylight. The optimum temperature for germination ranges from 68–86°F. It tolerates shade better than the annual species.

To maintain hay quality, sericea should be harvested when it is 12–15 inches tall. Sericea lespedeza is generally high in tannin, which can cause poor acceptance from livestock. Sericea lespedeza is recognized for its high levels of crude protein, but quality is offset by high concentrations of tannins that bind with proteins, leaving them unavailable for digestion. Tannins also reduce the palatability and digestibility of forages. The level of tannins in sericea might also increase with maturity of the plant, high air temperature, and low rainfall. Livestock

readily consume hay containing sericea lespedeza because field drying decreases the tannin concentration. Some of the most common varieties of sericea lespedeza include Arlington, Appalow, Cericea, Gasyn, Interstate, Interstate 76, Serala, Serala 76, AU Donnelly, AU Lotan (low levels of tannin and higher digestibility), and AU Grazer (grazing tolerant).

A 49-day feeding trial conducted at Auburn University compared the performance of free choice sericea lespedeza and bermudagrass hay. A set of 16 weaned steers in each group also received 6 pounds of soyhulls per animal per day. The sericea lespedeza group had higher ADG and lower hay intake than the bermudagrass hay group (Table 2). The lower intake could be related to tannin concentrations that reduce palatability and digestibility. Some studies have indicated that the consumption of sericea lespedeza by livestock could help control and reduce gastrointestinal parasite egg counts (chemical anthelmintics properties), reduce methane gas emission (due to tannin concentrations), and improve protein and amino acid utilization in ruminants.

A 2004 study examined the effect on worm egg counts in naturally infected goats that were given an artificial booster infection of *Haemonchus contortus* larvae and fed a diet of small amounts of concentrate with either sericea lespedeza or bermudagrass hay (Table 3). During the pre-trial portion,

**Table 2. Animal performance of steers consuming free choice sericea lespedeza or bermudagrass hay during a 49-day feeding trial in Alabama.**

| Hay type | Daily gains (lb/day) | Hay intake (lb) | Supplemental intake (lb) | Total intake (lb) |
|---|---|---|---|---|
| Sericea lespdeza hay | 1.5 | 9.2 | 6.0 | 15.2 |
| Bermudagrass hay | 1.4 | 13.6 | 6.0 | 19.6 |

**Table 3. Parasite egg counts in naturally infected goats fed an artificial booster infection of *Haemonchus contortus* larvae at pre-, during, and post-trial. Goats were fed diets of ground sericea lespdeza or bermudagrass hay with a small amount of concentrates.**

| Sampling times (weeks after parasite challenge) | Parasite eggs per gram of feces | |
|---|---|---|
| | BGH+Concentrate | SL+Concentrate |
| Pre-trial period | | |
| 1 | 300 | 238 |
| 2 | 179 | 263 |
| 3 | 321 | 88 |
| Trial period | | |
| 4 | 179 | 207 |
| 5 | 357 | 107 |
| 6 | 221 | 64 |
| 7 | 436 | 36 |
| 8 | 5,150 | 729 |
| Post-trial period | | |
| 9 | 1,314 | 514 |
| 11 | 233 | 0 |

goats grazed on pasture for 3 weeks and then consumed bermudagrass diets for 1 week. During the trial period, half of the animals were switched to sericea lespedeza after week 4 through week 8. During the post-trial period (weeks 8–11), all animals were switched back to the bermudagrass diet.

Results of the study indicated that fecal egg counts (FECs) were lower in the sericea lespedeza diet and that FECs increased over time. On the other hand, in the post-trial period, when goats were switched to the bermudagrass diet, the numbers for the sericea diet were lower, but there was no significant difference compared to the bermudagrass hay diet. This suggests a greater effect on worm fecundity than on worm numbers, which could have a larger effect on reducing pasture contamination.

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