

# Growing Lespedeza in Kentucky for Cattle, Sheep, and Goats

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## Introduction

Annual and perennial lespedezas are grown in Kentucky for pasture, hay, and soil stabilization.

Lepedezas are warm season legumes that complement cool season grasses in both pasture and hay situations. They are more tolerant of less fertile, more acid soils but have lower yield potential than other forage legumes such as red clover and alfalfa. The main perennial lespedeza, sericea lespedeza, is generally regarded as unpalatable by grazing cattle but hay making reverses this rejection. Hay making, processing (as in pelletizing), or ensiling reduces the level of condensed tannins in sericea lespedeza thought to be responsible for the unpalatability to cattle. Finally, recent research has shown that consuming sericea lespedeza (as pasture, hay, pellets or silage) significantly reduces the effects of gastrointestinal nematodes and parasitic protozoa in sheep and goats.

## Annual Lespedezas

Striate (*Lespedeza striata*) and Korean (*L. stipulacea*) lespedezas are summer annual legumes that are valuable for livestock and wildlife in Kentucky. Korean lespedeza is different from striate in that it tends to be more upright in growth, has wider, indented leaves, and flowers earlier (Figure 1). Seeds of Korean are borne at the end of branches while striate seeds are borne where the leaves join the main stem. Annual lespedezas are short day legumes that begin flowering in August and set seed in the short days of September and October. These lespedezas are true annuals that usually reseed themselves if competition is not too severe. They are fine-stemmed, leafy legumes with a shallow taproot system.



Striate or Kobe annual lespedeza showing the oblong rounded leaves. Korean annual lespedeza leaves are more lobed or heart-shaped and often have a indentation at the end of the leaf.

Due to a later flowering date, early fall frosts significantly reduce seed production of striate lespedeza compared to Korean. For this reason, its use is limited to southern and western Kentucky if consistent seed set is desired.

Striate, found in Georgia as early as 1846, has become distributed across the southeastern United States and is known as “common” or “wild jap” lespedeza. Kobe was the first named cultivar of striate because it originated in Kobe, Japan. Korean lespedeza was introduced into the U.S. in 1919 from Korea.

## Importance and Use

Annual lespedezas are most widely used as complementary pasture legumes and on a limited scale for seed production. Although lower yielding than red clover or alfalfa, annual lespedezas are useful because they are most productive from July through September when growth of cool season grasses is reduced. Annual lespedezas also provide good cover for reclaimed mine lands. Use of annual lespedezas in Kentucky and elsewhere has declined due to diseases of Korean lespedeza, availability of higher yielding legume species, and nitrogen fertilization of grass pastures.

## Growth Characteristics

Annual lespedeza germinates in early spring, but usually grows very little until mid-May to early June. Most of lespedeza's growth occurs in July and August, and flowering and seed production is initiated by short days in the fall. Clipping or grazing the tips of lespedeza can cause lower branches to spread along



**Figure 1.** Korean and striate lespedeza characteristics. In all drawings, Korean is on the left.

the ground. Lespedeza grows well with cool season grasses if spring nitrogen use is kept to a minimum. Striate lespedeza has a longer growing season than Korean and begins to flower and set seed later in the fall.

## Cultivars

Korean lespedeza cultivars include Rowan, Yadkin, Climax, and Summit. Amounts of these varieties are limited so common or uncertified Korean may be the only seed available. Until recently, Kobe was the only striate variety available. However, in the late 1980s, "Marion" was jointly released by the USDA-ARS and the Universities of Missouri and Arkansas. Marion was selected for earlier flowering date to increase the reliability of seed production. Therefore, this variety should be adapted to all of Kentucky.



A seedling of striate or Kobe annual lespedeza.



A seedling of Korean annual lespedeza.

## Establishment

Lespedeza is usually established as a pure stand (by seeding into a small grain stubble) or as a companion legume with cool season grasses. Seed 20 to 25 pounds per acre of Korean or 25 to 35 pounds per acre of striate to establish pure stands of annual lespedeza. When spring seeding with a cool season grass, use 10 pounds per acre of either lespedeza plus the appropriate amount of grass seed. Lespedeza can be overly competitive with cool season grasses in new seedings, especially if the seeding is made in late spring or if moisture is limiting. Grazing or clipping the lespedeza helps ensure that the grass seedlings survive.

Annual lespedezas can be used as renovation legumes for cool season grasses. The keys to establishment in existing sods are getting seed in firm contact with soil and reducing the competition from the grass. Broadcast or drill 15 pounds of seed per acre into existing grass swards in late winter or early spring. Broadcast lespedeza seed in late February or early March onto very closely grazed sod. Freezing and thawing of the soil surface works the seed into good contact with soil. Disturbing the sod with a light disking prior to broadcasting improves stand establishment. For late March and early April seedings, seeding with a no-till drill is recommended.

Minimize grass competition by avoiding any spring nitrogen applications and grazing or clipping the pasture closely in late April and May. Missouri research indicates that greatest lespedeza production occurs when the cool season grass growth is removed by clipping or grazing by mid- to late May (Table 1). Inoculate seed with rhizobia that are specific for annual lespedeza.

**Table 1.** Effect of timing of first harvest on season-long drymatter (DM) and crude protein (CP) yields of tall fescue-annual lespedeza mixtures.

Grass stage at first cutting.*	DM	DDM	CP
	lb/acre		
Boot to early head	6360	3390	750
Flowering	6170	3160	670
Mature seed	5172	2210	360

\*Yields are total of 3 harvests. Date of first harvest is variable, dates of second and third harvests are approximately August 1 and October 1, respectively, and are the same for all cutting systems. Unpublished data, University of Missouri.

## Management

### Fertility

Annual lespedezas grow on most well-drained soils and tolerate acidic pH and low fertility. However, lespedeza does respond well to both lime and fertilizer, especially phosphorus. Nitrogen application to lespedeza-grass mixtures reduces legume production due to increased grass competition.

### Hay and Pasture

Pure stands of lespedeza produce one to two tons of hay per acre. Harvest for hay at the early bloom stage, which normally occurs around August 1 (Table 2). This stage of maturity produces high quality forage and still allows time for the plants to produce seed (Table 2). Mixtures of a cool season grass and lespedeza can be used for hay or pasture and should yield two to three tons of dry matter per acre. Cool season grass-annual lespedeza mixtures produce less total annual yield but more and higher quality growth in mid- to late summer than grass plus nitrogen fertilizer. Grass-lespedeza mixtures managed for hay produces two cuttings by August 1. The first harvest should be taken by mid- to late May and should be primarily grass. Delaying this first cutting severely reduces the amount

**Table 2.** Crude protein (CP) and total digestible nutrient (TDN) content of annual lespedeza hay at four stages of maturity (dry matter basis).\*

Maturity	CP,%	TDN,%
Fresh, late vegetative	16.4	59
Hay, early bloom	15.5	55
Hay, mid-bloom	14.5	50
Hay, full-bloom	13.4	47

\*From "Nutrient requirements of beef cattle." 1984. Sixth Edition. National Research Council.



of lespedeza in the following cutting. The regrowth is primarily lespedeza and yields up to two tons of dry matter per acre by about August 1. Manage mixtures of grass/lespedeza for pasture by reducing grass competition in spring by grazing or clipping in May and avoiding nitrogen use in spring. Lespedeza pasture can be used by all types of livestock, but is especially valuable for cattle backgrounding operations. Grazing research on lespedeza generally shows high individual performance with limited total gain per acre, which reflects its low yield compared to other forage legumes.

### Management for Natural Re-Seeding

Annual lespedezas can produce significant amounts of seed that can lead to production of “volunteer” lespedeza in following years. To maximize seed production in annual lespedeza pastures, avoid excessive grazing pressure in September and October when the plants are flowering and setting seed. Lespedeza plants which have been grazed during summer are more prostrate in the fall and bear seed closer to the ground than ungrazed plants or lespedeza harvested for hay. This trait makes the seed less accessible to grazing livestock.

Lespedeza harvested as hay tends to be more erect than when grazed. Therefore, seed produced is more likely to be removed by grazing livestock, especially with the Korean types which bear seed on the ends of the shoots. Make hay harvests by mid-August and allow the fields to regrow, flower, and set seed. Kobe (striate types) bear their seed all along the stem and have more seed on the lower parts of plants than Korean or Summit lespedezas.

### Seed Production

Seed production of both of the annual species occurs in the late fall. Lespedeza is usually combined directly (without swathing) after the leaves are partially dry but before extensive shattering has occurred. Drying of leaves may occur at maturity or after a killing frost.

Over a four-year period at Lexington, per acre yields of cleaned (hulled) seed averaged 50 pounds for striate (range: 0 to 147 lb) and 212 pounds for Korean (range: 0 to 411 lb, depending on variety). In comparable tests in Princeton, striate yielded 49 pounds per acre, and Korean cultivars yielded from 103 to 448 pounds per acre. However, yields of up to 400 pounds per acre of either species are possible. Seed yields of the striate species, including Kobe, are usually lower than the Korean varieties in part because of damage caused by early frost.

### Perennial Lespedezas

The only perennial species of lespedeza used for forage to any extent in Kentucky is sericea (*L. cuneata*). It is drought resistant but not well adapted to poorly drained soils. It may be used in pasture or hay mixtures, sown at rates up to 30 pounds per acre. Hay quality is extremely low unless harvested when 12 to 15 inches in height. Likewise, animal acceptance and gains are best if the sericea is kept less than 12 to 15 inches in height. Because of its low seedling vigor, it should be established before overseeding with grasses such as tall fescue. Very little growth occurs in Kentucky before late May.



A late season view of sericea lespedeza showing its upright growth habit. This sericea is about 30 inches tall and has not been harvested during the current growing season.



A mid-stem segment of a shoot of sericea lespedeza.



A view of the upper stem of sericea lespedeza showing the branching that occurs late in the growing season.

Sericea lespedeza is naturally high in condensed tannins, a component of some forages that can cause poor acceptance in ruminants. Although reduced-tannin varieties are available (Serala, AU Lotan, AU Donnelly) and have performed well in Alabama, there are no data on their performance for Kentucky. In general, performance of cattle grazing sericea in Kentucky and other states has been poor because of poor animal acceptance and due to its naturally high tannin content. In grass-sericea pastures, grazing animals tend to eat the grass first and avoid sericea. In these cases, sericea becomes overmature and cannot support animal gains because of low forage quality. Proper utili-

zation of sericea in pastures usually depends on using a grazing system to force animals to graze sericea earlier when quality is higher. Alabama data indicate the use of a variety of sericea that is lower in tannin content results in improved animal gains compared to common sericea. However, be certain the variety is adapted to Kentucky before committing large areas to its use. Condensed tannin levels in sericea lespedeza are reduced by hay making, processing (pelletizing), or ensiled sericea, increasing the palatability to cattle.

Sericea lespedeza can have significant benefits for controlling internal parasites in sheep and goats. In a 2017 review by Terrill and Mosjidis, fresh (grazed), dried (hay, leaf meal, pellets) and preserved (ensiled) showed some level of anti-parasitic activity against GIN (gastrointestinal nematodes), particularly *Haemonchus contortus*, and in more recent studies, against the protozoan parasites (*Eimeria* spp.) that cause coccidiosis.

Based on the research cited in this review, Terrill and Mosjidis recommend using sericea lespedeza for parasite control in livestock by feeding it at 25 percent or more of the diet (along with other sources of supplemental energy or protein as needed to meet nutritional needs of specific classes of animals). Further, to control *Eimeria* spp., they recommend feeding two weeks prior to periods of stress that might lead to outbreaks of coccidiosis, such as weaning of kids or lambs, and then continue for an additional six weeks afterwards. Feeding prior to and during times

of stress is also recommended for control of the barber pole worm (*Haemonchus*), especially for kids and lambs at weaning and adult females during parturition and subsequent nursing twins and triplets.

Terrill and Mosjidis warn that feeding longer than eight weeks for younger animals is not recommended, as in some locations/farms, the condensed tannin in sericea lespedeza may bind some trace minerals and may slow weight gains. This does not seem to be a problem with long-term sericea lespedeza feeding in more mature animals. When sericea lespedeza feeding is discontinued, the animals should be observed closely for signs of parasitic infection and treated if necessary.

Sericea is useful for soil improvement, wildlife cover, and erosion control on roadsides. Two varieties for this purpose are "Interstate," developed by the Alabama Experiment Station, and "Appalow," developed by the Quicksand Plant Introduction Station of the Soil Conservation Service in cooperation with the University of Kentucky.

## Reference

Thomas Terrill and Jorge Mosjidis. 2017. Smart Man's Sericea Lespedeza and Worm Control: A Review. *Journal of Agricultural Science and Technology A* 7 (2017): 143-150. Published online: doi: 10.17265/2161-6256/2017.03.001.