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Annual Lespedeza

Craig A. Roberts
Department of Agronomy

Annual lespedeza is an acid-tolerant, drought-resistant, summer annual legume useful for pasture, hay and soil improvement. The two species of annual lespedeza grown in Missouri are *Kummerowia striata* (common) and *Kummerowia stipulacea* (Korean). Common lespedeza, a striate type, was first reported growing in Georgia in 1846. Because it came from Japan, it was called "Jap clover;" later it became known as common lespedeza. It grew in southern Missouri shortly after the Civil War. Another striate variety, named Kobe, was introduced from Japan in 1919. Kobe grows much larger than common lespedeza, is more erect and produces more hay or pasture. The striate varieties mature later and require a longer growing season than Korean. They are better adapted to the southern part of Missouri and states to the south. The common types also are more tolerant of lower fertility and more acid soils.

Korean lespedeza was introduced into the United States from Korea in 1919. Its introduction into Missouri was in 1921, when the Missouri Agricultural Experiment Station received a spoonful of seed from the U.S. Department of Agriculture. After five years of intensive study at MU, the experiment station sent five-pound packages of seed to 30 farmers for on-the-farm tests. All the farmers sent back encouraging reports. Acceptance of the crop was outstanding, and planted acreage in Missouri peaked at about 6 million acres in the early 1950s.

Plant description and use

Korean lespedeza (Figure 1) has broad, heart-shaped leaflets that are distinctly veined, while common and Kobe leaves are longer and less rounded on the ends. The few small hairs on the stems of the Korean varieties slant upward in contrast to those on common or Kobe. Flowers of both species range from purple to light pink. After flowering, leaves of Korean turn forward around the seed pod, which helps reduce seed shattering. Leaves of the common type do not fold around the seed pod, so they are more susceptible to shattering. The seeds of Korean lespedeza grow in clusters at the terminal end of each branch, while seeds of common lespedeza are set in leaf axils along the entire length of the stem.



Figure 1
Korean lespedeza in vegetative growth stage.

The most common earlier use of lespedeza was in an annual rotation with small grain. The initial seeding of lespedeza would be made into the small grain during late winter or early spring. The small grain would be harvested for pasture or grain, then lespedeza would be used for summer pasture or cut for hay. About the time the lespedeza was making seed, the ground would be worked and seeded back to small grains. Korean lespedeza also was grown alone for use as summer pasture or harvested for a good quality hay crop. It also was successfully planted into many acres of bluegrass pasture in central and northern Missouri. Lespedeza was used extensively in new seedings of orchardgrass or tall fescue in the late 1940s and 1950s.

Growth habits

Annual lespedezas will germinate in early spring but usually grow very little until June. Growth and seed production are related to photoperiod (day length), and most of lespedeza's forage production occurs during the long days in July and August. Plants are drought resistant and respond well to favorable conditions. Dry conditions may reduce growth, but the plants recover quickly following summer rains. Plants are more drought resistant in the seedling stage than alfalfa or clovers. Severe late-spring freezes may kill some of the early germinating lespedeza plants, but the problem is not as bad as with clovers. Mature lespedeza plants are killed by the first hard frost in the fall.

Clipping the top of lespedeza (grazing or mowing) will stop upward growth, causing lower branches to spread along the ground. It will withstand heavy trampling and will produce some seed even under heavy grazing. Lespedeza can compete well with most of the cool-season grasses if nitrogen (N) applications are kept low. The severity of grazing the companion grass will influence the rates at which nitrogen can be applied safely. However, most fertilizer applications containing more than 30 pounds of N per acre will reduce stands of lespedeza.

Loss of popularity

Lespedeza acreage in Missouri reached its peak in the early 1950s, then started to decline. Severe summer droughts of 1953 and 1954 were a factor, but the major reason for its decline was changes in fertilizer use and plant disease problems in Korean lespedeza.

Shortly after World War II, farmers started using more fertilizer on small grains, especially heavier rates of N. This increase brought about higher production of small grains, but the increased competition severely reduced lespedeza production. The heavier use of N fertilizer also had started on the fields of cool-season grasses, causing the same depleting effect on lespedeza. During this same time, bacterial wilt, tar spot and other plant diseases were becoming a more serious problem on Korean lespedeza. Reports from Missouri stated that Korean yields were reduced 50 percent or more by the presence of these diseases.

Increased use of lime and fertilizer also demonstrated that more productive legumes (alfalfa and clovers) could be grown.

Managing for best results

With proper management, annual lespedezas are easy to establish, reseed dependably and produce nutritious feed for most classes of livestock. The forage from lespedeza is fine-stemmed, with a high percentage of leaves, and does not cause bloat. Proper management, plus some summer rain, will allow lespedeza to produce quality pasture during midsummer when companion cool-season grasses are of low quality and not very productive.

Lespedeza pasture can be used by all types of livestock but is especially valuable for sheep and cattle backgrounding operations. In a five-year grazing trial near Batesville, Arkansas, yearling cattle gained 1.8 pounds a day on lespedeza. This study reported 80 days of normal grazing time with a stocking rate of 1.1 to 1.5 animal units per acre during July and August. Some early Missouri studies reported the following results of grazing trials with beef steers:

- Wheat-lespedeza annual pasture rotations averaged producing 285 pounds of beef per acre, and the steers gained 1.7 pounds per day.
- Northern Missouri studies with beef steers on lespedeza-bluegrass pastures receiving no N fertilizer produced 201 pounds of beef per acre and 2.02 pounds average daily gain.

Lespedeza is good pasture for dairy heifers but, when mature, can cause problems in lactating dairy cows. Dairy producers note that grazing lespedeza after it is in bloom decreases milk production.

Lespedeza can be grown with all of the adapted cool-season grasses but performs best with orchardgrass. Early Missouri grazing trials reported more pounds of beef from lespedeza-orchardgrass than from lespedeza-fescue (endophyte level unknown).

Lespedeza can be rotated with small grains if N applications do not exceed 20 to 30 pounds per acre. Grazing the small grain closely in the spring will help lespedeza survive applications of N.

Lespedeza has an added value where quail production is important because annual lespedeza seed is an excellent quail food.

Hay yield and quality

Lespedeza will produce less forage per acre than properly managed alfalfa or clover but can be maintained with lower production costs.

Feeding trials report that lespedeza hay is only slightly less valuable than alfalfa for wintering calves and dairy heifers. However, lespedeza hay is inferior to alfalfa when fed to lactating dairy cows. It makes excellent hay for sheep and all types of beef cattle. Lespedeza leaves contain approximately twice as much protein as stems.

Early studies in Tennessee reported that lespedeza yields increased with maturity, and percent leaf declined as maturity advanced (Table 1).

Table 1
Hay and percent leaf yields of Korean lespedeza in Tennessee

Species	Hay yield	Leaves only	Percent leaves
Korean, pre-bloom	1.08 tons per acre	0.77 tons per acre	68.42
Korean, first bloom	1.84 tons per acre	1.17 tons per acre	61.85
Korean, late bloom	2.37 tons per acre	1.17 tons per acre	53.15

Missouri farmers ordinarily can produce 1 to 2 tons of lespedeza per acre depending on variations in weather and management. Lespedeza should be harvested for hay no later than early bloom stage. This stage of maturity will produce quality forage and still allow time for the plants to produce seed. Six to 8 inches of growth above the cutter bar will produce at least 1 ton of hay per acre if harvested properly.

To avoid severe leaf loss at hay making, cut, condition and windrow in one operation. A characteristic that aids in the curing of lespedeza is that its small stems contain low amounts of water. Good curing weather may make it possible to cut in the morning and bale in the afternoon of the same day.

Fertility management

Annual lespedezas grow on most well-drained soils, tolerate low fertility, yet respond to soil treatment — especially lime and phosphorus. Some early fertility studies in Missouri reported that yields of lespedeza more than doubled from applications of lime plus phosphorus and potash (P and K). It also was reported that the yield response of lespedeza to lime, P and K may increase greatly after the legume has occupied the land long enough to deplete the available soil nutrients. Proper applications of lime and phosphorus are important on the state's shallow soils.

Missouri researchers report that lespedeza performs well in the pH range of 5.5 to 6.0. The pH should not be allowed to drop below 5.0 or growth of lespedeza will be depressed. Applications of K usually give a marked response after the soil has been limed and phosphated.

Soil test reports for the shallower Missouri soils recommend 40 to 60 pounds P plus 30 to 60 pounds K for annual topdressings of lespedeza-grass pasture. Use slightly more K for hay production.

Topdressing as little as 30 pounds of N in spring will decrease yields of lespedeza and increase spring grass production. A fertility study in central Missouri reported that 60 pounds N and 120 pounds N per acre seriously reduced summer production of lespedeza in tall fescue-lespedeza pastures (Table 2).

Table 2

Season distribution of forage yields with different N rates (0, 60 and 120 pounds N applied to fescue/Summit lespedeza)

Harvest dates	0 pounds N		60 pounds N		120 pounds N	
	Percent of total yield	Percent Legume	Percent of total yield	Percent Legume	Percent of total yield	Percent Legume
May 17	14.2	0	56.3	0	48.4	0
Aug. 18	74.1	71	35.8	43	36.3	34
Nov. 15	11.7		7.9		15.3	
Total yield	2,743 pounds per acre		3,313 pounds per acre		4,029 pounds per acre	

Seeding rates and establishment

For pure lespedeza stands, seed 20 pounds of seed per acre. In mixed stands, seed 15 pounds per acre of either type as a dormant seeding into established cool-season grasses. When spring drilling as a companion legume with a cool-season grass, seed 10 pounds per acre of either lespedeza type with the proper amount of grass seed.

Certified lespedeza seed will be at least 78 percent pure live seed (PLS) and contain about 236,000 seeds per pound.

Lespedeza usually is established as a pure stand following small grains or as a companion legume with cool-season grasses. In a pure stand, the higher rates are necessary for top yields. In mixed stands, a lower rate is suggested when the grass and lespedeza are sown together rather than seeded into an existing stand.

Lespedeza has proven to be competitive with cool-season grass seedlings when spring seedings are made late or when soil moisture is limited. Be prepared to mow or lightly graze the lespedeza in summer to ensure that the seedling grass plants survive.

Sow lespedeza with the grass in March or April. If adding to fall-seeded grass, apply lespedeza on top of the ground in the winter to allow time for freezing and thawing to cover some of the seed. Do not seed lespedeza in the fall. It is an annual and will be killed if it germinates in the fall. You can add lespedeza successfully to old stands of grass by broadcasting during the winter. You'll get better results when the grass sod is lightly disked before applying seed.

A fertilizer application containing 40 to 60 pounds of phosphate (zero N) helps the lespedeza compete and make desirable summer growth. Give the small, slow-growing lespedeza plants more of a chance to survive by grazing the companion grass close until the lespedeza has started good, fast growth. Then remove animals until there is adequate growth for either pasture or hay.

Don't inoculate lespedeza seed unless you're seeding in an area where it has never been grown. Be sure to buy inoculum that is specifically for lespedeza; this often will be an inoculum also used for cowpeas.

Varieties

The best lespedeza variety reseeds consistently each year and is disease resistant. Striate lespedezas (common, Kobe) reseed dependably only when grown in the southern one-third of Missouri because of the longer growing season.

Korean types of lespedeza in Missouri are susceptible to bacterial wilt and tar spot. Disease pressure varies from year to year, but disease resistance must be considered in selecting varieties. Early Missouri studies found bacterial wilt to be most destructive in old volunteer stands of Korean subjected to heavy grazing. Korean produces satisfactory yields in years when bacterial wilt and tar spot are not serious problems.

Summit was released by Arkansas and Missouri in 1962. Summit produces good yields throughout the state, is slightly later (about seven days) in maturity than Korean and has some resistance to bacterial wilt and tar spot. It is becoming more difficult to get pure seed supplies of this variety.

Kobe is resistant to these serious diseases. The major problem with Kobe is that it matures later in the season than Korean and may not produce seed before the first killing frost. Kobe usually produces acceptable amounts of seed in the southern third of the state in years without an unseasonably early frost.

A new selection of common lespedeza, known as Marion, is resistant to bacterial wilt and tar spot. This is a fine-stemmed, high-producing pasture type (not upright growth) that matures early enough to produce seed throughout the state. Marion retains its leaves late into the season and has been the most popular variety in Missouri since its release in the spring of 1989 (Figure 2).



Figure 2

This first-year stand of Marion lespedeza was planted in early spring.



MU forage researchers report that improvements can be made in developing new lespedeza varieties. These efforts continue at the Southwest Research Center near Mt. Vernon and the Bradford farm at Columbia. Research emphasizes developing varieties that have both high seed and forage yield along with disease resistance. Scientists at MU are screening the entire U.S. collection of lespedeza germplasm to find new, improved types.

Seed production

Lespedeza seed may be harvested by combining directly or by combining a windrow that has been swathed and cured. Most seed harvests are in October. Yields of 200 to 400 pounds per acre are realistic, while yields of 500 to 600 pounds are possible under good growing conditions. Yields of more than 1,000 pounds per acre have been reported in Missouri. For best results, apply lime (CaO), P and K, according to soil test. Clipping the tops early or allowing cattle to graze tops of young plants increases seed yields of the Korean type. However, it may be more difficult to harvest the seed because upward growth stops when clipped and side branches grow close to the ground.

Reclean seed from the combine to take out the seeds of such weeds as ragweed, poverty weed and dodder. Dodder seed can be a problem because it is about the same size as the Korean-type seeds. If a field is to be harvested for seed, eradicate dodder by burning the infested areas or cutting and removing it. Carefully selecting clean sources of original seed supplies reduces problems with dodder.

Korean lespedeza weighs 44 to 45 pounds to the bushel and contains about 240,000 seeds per pound. Kobe lespedeza seed weighs 30 pounds to the bushel and contains about 227,000 seeds per pound.

Summary

Annual lespedeza is a nonbloating legume that can be grown on most soils of Missouri. It is easy to establish, reseeds itself except under severe drought conditions and produces nutritious forage during hot summer conditions. Lespedeza tolerates low fertility but responds to applications of lime and phosphorus. It provides quality pasture at a time when cool-season grasses are of low quality and are producing very little. Lespedeza produces good seed yields for combining and makes quality food for bobwhite quail.

Lespedeza grows slowly in the spring and produces very little pasture before late June. Dry matter yields of lespedeza are lower than alfalfa or clover when grown under favorable growing conditions. Lespedeza occasionally may fail to reseed under extremely hot, dry growing conditions. Kobe may not reseed in years with unseasonably early frosts. Diseases can cause serious reductions in yields of Korean lespedeza. New variety releases give some protection from diseases and add to the forage yield potential of lespedeza.

The information in this publication was originally developed by former extension specialist Jimmy C. Henning.

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