FabaceaeCPea family

Lespedeza Michx.

lespedeza

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Growth habit, occurrence, and use. The genus *Lespedeza* includes about 140 species of shrubs, half-shrubs, and herbs (Hensen 1957). Most species are native to the temperate regions of eastern Asia and only about 11 species are considered native to North America (Clewell 1966). All native species are herbaceous; however, several species of shrub lespedeza have been introduced into the United States (table 1). The non-native shrub lespedezas tend to have herbaceous stems with woody bases. All species listed in table 1 are planted for conservation and management purposes (Kelsey and Dayton 1942; Strausbaugh and Core 1964). Both shrub and Thunberg lespedezas are commonly referenced in the floristic literature (Gleason and Cronquist 1991). Leafy lespedeza, a less frequently referenced species, is noted by some to occur in the central-eastern United States (Clewell 1966; Isely 1990; Kartesz 1994). Although the name *L. japonica* has been used since the 1930=s, many of the *L. japonica* materials have been re-identified as *L. thunbergii* (Vogel 1974). Classification of these shrubs is difficult and confused because of variation resulting from interspecific hybridization (Clewell 1966). Shrub lespedeza is the most common and widely planted shrub in the genus in the United States (Davison 1954; Vogel 1974).

Lespedeza shrubs are adapted primarily to the southeastern two-thirds of the United States, except for southern Florida (Clewell 1966; Davison 1954). They are planted mainly for wildlife food and cover (Owsley and Surrency 1989) and for erosion control (Gabrielson and others 1982; USDA SCS 1980). Soil enrichment by nitrogen-fixing symbionts is also a potential benefit (Allen and Allen 1981). The seeds are preferred quail food (Crider 1952; Davison 1954; Vogel 1974). Some plantings have been made for ornamental purposes (Clewell 1966; Crider 1952). Grown to maturity, plants of shrub lespedeza may reach a height of 3 m but more commonly 1.2 to 2.4 m (Crider 1952; Davison 1954; Vogel 1974). In management for seed production, stems of some shrub lespedezas must be cut back to the ground (Davison 1954; Vogel 1974).

Superior strains. Superior strains of shrub lespedeza have been selected and developed mostly at the plant material centers of the USDA Natural Resources Conservation Service (formerly the Soil Conservation Service) in the East and Southeast (Vogel 1974). Strains 100 and 101 of shrub lespedeza were developed for their greater production of seed and persistence of fruits on the plants after ripening (Davison 1954). *L. bicolor* ›Natob= matures seeds much earlier and is more winter-hardy than any other strain of shrub lespedeza grown in the United States. Thus, it can be grown farther north than other shrub lespedezas (Clewell 1966). A selection of Thunberg lespedeza called

VA-70 (USDA SCS 1980) ripens seeds a month earlier than most strains of shrub lespedeza, thus adapting it to the mountains and more northerly areas of the South (Vogel 1974).

Seeds of these strains have been marketed, but production has been so erratic that seed supplies can be scarce or nonexistent. Some problem exists in maintaining seed supplies of pure strains, apparently because of cross-pollination.

Flowering and fruiting. The flowers are loosely arranged on elongate racemes and are mostly rose-purple, with gradation to white in some variants (Ohwi 1965; Rehder 1940; Strausbaugh and Core 1964). The chasmogamic flowers may be self- or cross-pollinated (Clewell 1966; Crider 1952; Ohwi 1965). Honeybees, bumblebees, and other insects are necessary for pollination (Crider 1952; Graetz 1951).

Time of flowering and fruiting varies among species and strains, but it is also controlled by the latitude where the plants are grown. Flowering occurs mostly in July and August but will begin in June in Mississippi and as late as September in Maryland. The brown fruits are 1-seeded indehiscent legumes (pods) that mature mostly in late September and October (Vogel 1974) (figure 1). The legumes fall to the ground when ripe, and most of them are down by early winter (Crider 1952).

A light seed crop may occur the first year from 1-year-old transplants, and good seed crops can be expected each succeeding year (Crider 1952). Seeds of shrub lespedeza are pale brown to olive and copiously flecked with purple. Seeds of Thunberg lespedeza are solid dark purple (Musil 1963) (figure 1). Seeds of lespedeza have little or no endosperm (figure 2).

Collection of fruits; extraction and storage of seed. Shrub lespedeza seeds are most commonly harvested with a combine as soon as the fruits are ripe and moderately dry. The combined material, which includes stems, intact legumes, and hulled seed, is air-dried and then cleaned to separate seed and legumes from the stems and inert matter. Seeds that remain in their legumes can be hulled by again running them through a combine or through a huller-scarifier and then cleaned (Vogel 1974).

Seed yields may exceed 560 kg/ha (500 lb/ac) (Byrd and others 1963), but more commonly yields range from 336 to 447 kg/ha (300 to 400 lb/ac) (Crider 1952; Vogel 1974). Weight of cleaned seeds/vol was 67 kg/bu (60 lb/bu) (Vogel 1974). The number of cleaned seeds is about 187,000/kg (85,000/lb) for common shrub lespedeza (Crider 1952; Strausbaugh and Core 1964; Vogel 1974); 140,000/kg (64,000/lb) for ›Natob= *bicolor* (Crider 1952; Vogel 1974); and 154,000 to 159,000/kg (70,000 to 72,000/lb) for Thunberg lespedeza (Strausbaugh and Core 1964; Vogel 1974).

Seeds are stored at 10 ºC and 40% relative humidity. They may be stored either hulled or unhulled, but seeds stored in the hull remain viable longer than hulled seeds. Length of viability varies with harvest years and storage treatment, but seeds have been viable after 20 years of storage (Vogel 1974).

Pregermination treatments. A high percentage of shrub lespedeza seeds have hard seedcoats and should be scarified before planting. Mechanical scarification is the preferred method. A huller-scarifier is one machine used for this purpose (Vogel 1974). About 50% of the seeds cleaned in a hammermill will be scarified. Fifty percent scarification allows a good stand to become established the first year but holds some seeds dormant for germination the second year. This could help assure stand establishment in case of failure or poor establishment the first year (Vogel 1974).

Seeds can also be scarified by immersion in concentrated sulfuric acid for 30 minutes, followed by washing and drying (Crider 1952). The acid treatment causes less damage to older brittle seeds than does mechanical treatment (Vogel 1974).

Germination tests. Germination tests can be made by placing seeds between blotters in a petri dish, in a rolled towel (either horizontally or vertically), or in sand or soil and holding them at temperatures of 20 ºC for 16 hours and 35 ºC for 8 hours for each day. Light is not required, but it has been used with no effect on germination. First counts of germinated seeds are made at 7 days and last counts at 21 days. Percentage germination is similar for all 3 species; the average is about 76%. Seed purity is 95% or higher (Vogel 1974).

Nursery practices. Seeds should be broadcast in large quantities—11 to 16 kg/ha (10 to 14 lb/ac)—on a firm seedbed lacking weeds (USDA SCS 1980). Inoculation with a specific *Rhizobium* strain is recommended at the time of planting (USDA SCS 1980). When growing seedlings for transplanting, rows should be spaced 0.9 to 1.2 m (3 to 4 ft) apart and planted with 39 to 66 seeds/m (12 to 20 seeds/ft) of row. Seeds inoculated with group 4 (cowpea) inoculant are sown in shallow furrows and covered 6 to 13 mm (¼ to ½ in) deep. Mid-spring is the ideal time for seeding. The time interval for seeding starts in the spring at the last expected frost date and continues thereafter for about 6 weeks. Seeds are treated with tetramethethylthiuram disulfide (thiram) for fungus control. About 95% of the 1-year-old seedlings are usable. For producing wildlife food, direct seeding in the field is more popular than transplanting seedlings (Crider 1952; Vogel 1974). Optimal growth occurs in well-drained, non-acidic soils (USDA SCS 1980).

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Figure 1C*Lespedeza,* lespedeza: legumes (above), × 4; seeds (below), × 8.

Figure 2C*Lespedeza thunbergii,* Thunberg lespedeza: longitudinal section through a seed, × 16.

Table 1C*Lespedeza*, lespedeza: nomenclature and occurrence

Scientific name & synonym(s)	Common name	Occurrence
***L. bicolor* Turcz.**	**shrub lespedeza** bicolor lespedeza	Origin: E Asia; Arkansas to Virginia, S to N Florida & Texas
***L. cyrtobotrya* Miq.**	**leafy lespedeza** shrub lespedeza	Origin: temperate E Asia; central-eastern US
***L. thunbergii* (DC.) Nakai** *L. sieboldii* Miq. *L. racemosa* Dipp. *L. formosa* Koehne *Desmodium penduliflorum* Oudem. *L. japonica* Bailey	**Thunberg lespedeza**	Origin: E Asia; similar range as shrub lespedeza but not as far N; best adapted to N Florida, S Alabama, & S Mississippi

Sources: Clewell (1966), Isely (1990), Kartesz (1994), Vogel (1974).