

Lespedeza : Sects. Macrolespedeza and Heterolespedeza from Japan, Corea and Formosa

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In 1927 Nakai⁷ critically revised the species of *Lespedeza* from Japan and Corea. In 1942 and 1946 P. L. Ricker^{9,10} described additional new species from China and Japan. Nakai's work is the most important one so far as the Japanese and Corean species are concerned and I agree with his treatment of the sectional divisions, but I cannot follow him in establishing many small species. These were distinguished on very variable characters. Therefore, about half of his species have been reduced to synonymy by Ohwi and Kitamura. I also agree with their reductions, but I cannot agree with the specific concepts of some of their species.

Species of *Lespedeza* seem to be clearly defined, but it is a truly difficult genus to differentiate. Therefore, the taxa differ according to the taxonomists. To this fact may be attributed the deficiency of good characters to differentiate each species.

The following criteria are those which have been used in delimiting species :

1. The size of the calyx, the degree of tapering of the calyx-lobes, and their length proportional to the length of the calyx-tube.
2. Whether the stems above the ground persist or die in winter.
3. Whether the branches are pendulous or not.
4. Whether the leaves have persistent appressed hairs above.
5. Whether the hairs on the shoots and rachises are appressed or patent.
6. Whether the racemes are longer than their subtending leaves.
7. The forms of the leaves and their apices, i.e. acuminate, acute, rounded, or retuse.
8. Whether each bracteole bears either 1 or 2 flowers in its axil.
9. The arrangement of the bud scales in the bud, i.e. imbricate or 2-ranked (decussate).
10. The forms and size of the bracteoles and stipules, and number and degree of prominence of their ribs.
11. Whether or not the leaves turn dark when dried.
12. Whether the branchlets are zigzag or not.
13. The density, kinds, and length of hairs on the lower leaf-surface.
14. The length of the pedicels.
15. The forms and size of the pods.

Discussion

1. Generally the calyx does not differ much from one species to another, except in Sect. *Heterolespedeza* where it is generally small, about 2-4 mm. long. In regard to the degree of tapering of the calyx-lobes *L. floribunda* is distinctive in having long setaceous

lobes. But in other species in our area, except for *L. buergeri*, I have found this is of little use as a distinguishing character because of its great variability. Thus, in *L. homoloba* the apices of the calyx-lobes vary from acuminate to obtuse. In *L. bicolor* they vary from obtuse to acute. Therefore, it seems meaningless to distinguish *L. bicolor* var. *japonica* from *L. bicolor* as a variety by the shape of the apices of the calyx-lobes. The proportional length of calyx-lobes and the calyx-tubes is also variable. In *L. bicolor* the ratio of length of lobes to tubes is about 1 : 3, though in other species it is usually about 1 : 1.

2. In most species in our area the stems above the ground persist and become shrubby, but in some species they die after one year, although this may vary according to the latitude. The stem of *L. formosa* f. *albiflora*, currently known as *L. japonica*, in middle and northern Japan persists one year, but for a few years in South Kyusyu. In *L. thunbergii* it dies in a year even in South Kyusyu, which fact suggests that this species is of southern origin. Nakai reports on the dying of the aerial stems of *L. thunbergii*, *L. formosa* (*L. nipponica*), and *L. patens* in a year in Tokyo, but according to my observations two varieties of *L. formosa*, which are indigeneous to Kagoshima Prefecture, actually become shrubs.

3. The branches of *Lespedeza* are usually ascending, but in *L. thunbergii* they are so pendulous that the apical portions often touch the ground. The branches of *L. formosa* var. *shiroyamensis*, *L. inabensis*, and *L. formosa* f. *albiflora* tend to hang down more or less, but this phenomenon is especially seen in the branches from younger stock, and is not so conspicuous in older plants. There are some individuals of *L. homoloba* and *L. cyrtobotrya* which have erect stems with pendulous branchlets.

4. Significant specific differences are the presence or absence of persistent hairs on the upper leaf-surface. *L. formosa* and its varieties always have dense appressed and persistent hairs there by which they are easily distinguished from other allied species. At least at first *L. bicolor* has leaves more or less densely covered by appressed hairs, but these usually disappear in autumn though they persist up to autumn in some individuals. However, *L. bicolor* is easily distinguished from *L. formosa* by its longer hairs, which are about 1/2 mm. long; in *L. formosa* they are 1/3 mm. long. At first *L. maritima*, *L. liukuensis*, *L. argyrophylla*, and *L. buergeri* ssp. *praecox* have also similar appressed hairs on the upper leaf-surface, but they disappear completely or persist only sparsely, even in autumn, though in *L. buergeri* ssp. *praecox* f. *tomentella*, they persist completely up to autumn. Usually *L. buergeri*, *L. homoloba*, and *L. inabensis* have leaves which are glabrous above, though some individuals initially have scattered hairs on the upper surface. From the character of hairs mentioned above I cannot accept the reduction of *L. formosa* f. *albiflora* to a variety of *L. thunbergii*.

5. In most *Lespedeza* species in our area hairs of branchlets, petioles, and rachises are appressed though in some species or forms they are patent. This phenomenon is also observed in other genera of the bean family, such as *Desmodium*, *Galactia*, etc. Therefore, this character seems to have minor importance in the specific differentiation. In our area I have noted such hairs in some species such as *L. cyrtobotrya*, *L. bicolor*, *L. formosa*, *L. buergeri*, and *L. thunbergii*. But I have never seen *L. homoloba* with patent hairs. According to the original description *L. hupehensis* Ricker from C. China also has patent hairs. This may be a patent-haired form of *L. formosa* or other already known species.

6. In most *Lespedeza* species in our area the racemes are usually longer than the subtending leaves, though they are shorter in *L. cyrtobotrya*. Some individuals of *L. homoloba*

and *L. bicolor* rarely have racemes shorter than their subtending leaves. In this instance it is often not easy to distinguish them merely by the above characters, though the first species is easily distinguished by the glabrate midrib on the lower leaf-surface. *L. formosa* var. *australis*, *L. maritima* and its variety, *L. formosa* var. *shiroyamensis*, and *L. satsumensis* have racemes scarcely as long or only slightly longer than their subtending leaves. *L. thunbergii*, *L. buergeri* and its ssp. *praecox*, *L. patens*, *L. homoloba*, *L. hayatae*, *L. liukiensis*, and *L. inabensis* have the racemes longer than their subtending leaves. In *L. thunbergii* they attain a length of 15 cm. Most species of *Lespedeza* have racemes with flowers fairly evenly dispersed on the rachises and scarcely extending to near the base, i.e. with a long stalk or peduncle, though the flowers of *L. bicolor* tend to be crowded on the upper part of the raceme. *L. formosa*, *L. thunbergii*, and *L. chekiangensis* often have terminal panicles which seem to be abnormal.

7. *L. buergeri* and its ally, *L. thunbergii* and *L. maritima*, usually have acute leaf apices, though those of the first are often obtuse or rounded.

8. Generally in *Lespedeza* there are two flowers in the axil of each bracteole of the racemes, but in *L. maritima* there is only one.

9. Most species of *Lespedeza* have buds with spirally arranged bud-scales, though in the group of *L. buergeri*, which belongs to the Sect. *Heterolespedeza*, the scales are arranged in two ranks (decussate). Nakai⁶ attached great importance to the arrangement of the bud-scales and the character of the inflorescence and established the new section, *Heterolespedeza*. I agree with him in establishing this new section, but I would add another character to the sectional diagnosis, namely the elevated and numerous ribs of the stipules and bracteoles.

10. Most species of *Lespedeza* belonging to the Sect. *Macrolespedeza* have subulate stipules and bracteoles, the ribs of which are usually only one to three and are not prominent.

11. Some species, such as *L. homoloba*, *L. hayatae*, and *L. bicolor*, are characterized by the leaves turning dark when dried. This, however, may depend at least in part on the method of drying of the specimens.

12. Most species of *Lespedeza* have nearly straight branchlets though those of some species, such as *L. buergeri* and *L. formosa* var. *shiroyamensis*, tend to change direction at each node, thus becoming zigzag.

13. The kinds and density of the hairs on the leaves beneath are very variable, even in the same species, and according to the habitat where they grow. *L. floribunda* is characterized by having densely sericeous and silvery indumentum on the lower leaf-surface.

14. *L. buergeri* and its ally and *L. cyrtobotrya* have short pedicels, but in *L. patens*, *L. thunbergii*, *L. inabensis*, etc. the pedicels are longer, often attaining a length of 4-5 mm.

15. The size and forms of the pods of *Lespedeza* are very variable, even in the same species and according to the age of the shrub and the density of the flowers in the racemes. *L. buergeri*, *L. argyrophylla*, and *L. maritima* have oblong pods about 10-15 cm. long, though *L. bicolor* has nearly orbicular pods about 5 mm. long.

Key to the species, varieties and forms

1. Bud scales 2-ranked; racemes short, stalked or sessile; stipules and bracteoles with many prominent ribs and usually broad.

2. Calyx 2-4 mm. long, the lobes setaceously acuminate; flowers rose-purple; branchlets with dense patent hairs.
 3. Leaves glabrous or nearly so above when young..... *L. buergeri* ssp. *praecox*
 3. Leaves silky pubescent above when young... *L. buergeri* ssp. *praecox* f. *tomentella*
2. Calyx 2-3 mm. long, the lobes ovate to oblong, acute.
 3. Leaves acuminate, lustrous above; branchlets nearly glabrous; flowers with white standard, deep purple wings, and rose keel.....*L. buergeri* ssp. *tricolor*
 3. Leaves usually acute, rarely obtuse to emarginate, dull above; flowers purplish white.
 4. Branchlets with appressed hairs 1. *L. buergeri*
 4. Branchlets with patent hairs *L. buergeri* f. *angustifolia*
1. Bud scales spirally arranged; racemes with distinct slender peduncles; stipules and bracteoles with one or a few ribs and usually narrow.
 2. Uppersurfaces of leaves densely covered with persistent appressed hairs about 1/3 mm. long.
 3. Branchlets densely covered with patent hairs.
 4. Racemes apparently longer than the subtending leaves; branches pendulous or spreading.
 5. Branches pendulous at least when young; flowers about 1 cm. long; pedicels about 2 mm. long..... ..*L. formosa* var. *shiroyamensis*
 5. Branches not pendulous; flowers about 1.4 cm. long; pedicels about 4 mm. long..... ..*L. formosa* f. *sericea*
 4. Racemes as long or shorter than the subtending leaves; branches not pendulous..... *L. formosa* var. *australis*
 3. Branchlets covered with appressed hairs.
 4. Flowers white; branchlets usually pendulous when young *L. formosa* f. *albiflora*
 4. Flowers not white.
 5. Flowers all rose-purple; branches rarely pendulous 2. *L. formosa*
 5. Flowers with white keel and purple standard and wings..... *L. formosa* f. *versicolor*
 2. Uppersurfaces of leaves glabrous or sparsely covered with caducous appressed hairs about 1/2 mm. long (if the hairs are dense they persist up to autumn).
 3. Racemes usually shorter than the subtending leaves.
 4. Shrubs less than 1 m. high, stoloniferous, littoral; pedicels usually solitary in the axils of bracteoles; leaflets acutish, with caducous appressed hairs above.
 5. Branchlets with appressed hairs.....3. *L. maritima*
 5. Branchlets with patent hairs *L. maritima* f. *Uyeki*
 4. Shrubs 1-3 m. high, without stolons; leaflets obtuse to emarginate, usually glabrous above from beginning; usually each bracteole bears 2 flowers.
 5. Racemes 1-2 cm. long, loosely flowered..... 4. *L. satsumensis*
 5. Racemes scarcely more than 1 cm. long, densely flowered.
 6. Branchlets with appressed hairs.....5. *L. cyrtobotrya*
 6. Branchlets with patent hairs..... *L. cyrtobotrya* f. *kawachiana*
 3. Racemes usually longer than the subtending leaves.
 4. Undersurfaces of leaves thinly covered with appressed hairs about 1/3 mm.

- long, occasionally the midribs nearly glabrous beneath6. *L. homoloba*
4. Undersurfaces of leaves including the midribs beneath more or less densely covered with appressed hairs.
 5. Leaves densely grey-silky beneath; calyx-lobes linear-subulate..... 7. *L. floribunda*
 5. Leaves not densely grey-silky beneath; calyx-lobes not linear-subulate.
 6. Leaves chartaceous, rarely turning dark when dried; numerous flowers evenly spaced along the rachis; branchlets stouter and loosely branched; pods usually elliptical to obovate-elliptical 8-15 mm. long (in *L. liukiensis* and *L. hayatae* unknown).
 7. Branchlets conspicuously pendulous.
 8. Leaflets oblong to oblong-lanceolate, acute on both ends; racemes usually 10-15 cm. long; pedicels 3-7 mm. long; flowers rose-purple; cultivated.
 9. Branchlets with appressed hairs.....8. *L. thunbergii*
 9. Branchlets with patent hairs.....*L. thunbergii* f. *sericea*
 8. Leaflets elliptical to obovate-elliptical rarely oblong, acutish to obtuse; racemes 3-10 cm. long; pedicels 2-4 mm. long; flowers white 9. *L. inabensis*
 7. Branchlets scarcely pendulous.
 8. Flowers white 9. *L. inabensis*
 8. Flowers not white.
 9. Undersurfaces of leaves greyish, densely covered with appressed hairs
 10. Leaves covered beneath with short hairs (about 1/3 mm. long), at first also sparsely pilose above; pods 9-15 mm. long..... 10. *L. argyrophylla*
 10. Leaves covered beneath with longer hairs (about 1/2 mm. long), also above at first more or less densely covered with caducous hairs; pods unknown..... 11. *L. liukiensis*
 9. Leaves not greyish beneath when dried.
 10. Racemes usually less than 5 (1-7) cm. long; pedicels 3-7 mm. long; leaves not turning dark when dried; pods obovate oblong about 1 cm. long.
 11. Branchlets with patent pairs 12. *L. patens*
 11. Branchlets with appressed hairs..... *L. patens* f. *macrantha*
 10. Racemes usually 7-8 cm. long; pedicels 3 mm. long; leaves turning dark when dried; pods unknown.....13. *L. hayatae*
 6. Leaves usually thinner and turning dark when dried; flowers of the racemes fewer (usually less than 10) and usually congested on the upper portion of the rachis; branchlets slender and densely branched; pods nearly round about 5 mm. long.
 7. Leaves nearly glabrous above at autumn.
 8. Branchlets, undersurfaces of leaves, and calyces not silky pubescens.
 9. Branchlets with appressed hairs 14. *L. bicolor*
 9. Branchlets with patent hairs *L. bicolor* f. *patens*

8. Branchlets, undersurfaces of leaves, and calyces silky pubescens.....
 *L. bicolor* f. *sericea*
 7. Leaves tomentellous above at autumn..... *L. bicolor* f. *tomentella*

Enumeration of the species

1. ***Lespedeza buergeri*** Miq., in Ann. Mus. Bot. Lugd.-Bat. 3(1867) 47; Nakai, *Lespedeza Japan & Korea* (1927) 31, fig.

Lespedeza oldhamii Miq., in Ann. Mus. Bot. Lugd.-Bat. 3(1867) 48.

Lespedeza buergeri var. *oldhamii* Maxim., in Act. Hort. Petrop. 2(1873) 354.

Lespedeza buergeri f. *albiflora* Honda, in Bot. Mag. Tokyo 46(1932) 422.

Lespedeza buergeri var. *oldhamii* f. *albiflora* Honda, l. c. 422.

Lespedeza buergeri var. *retusa* Hatusima, in Journ. Jap. Bot. 12(1936) 876.

Lespedeza hiratsukae Nakai, in Journ. Jap. Bot. 14(1938) 637, syn. nov.

Lespedeza buergeri f. *oldhamii* (Miq.) Sugimoto, New Keys Japan. Trees (1961) 463.

Lespedeza buergeri f. *retusa* (Hatusima) Sugimoto, l. c. 463.

Lespedeza buergeri f. *albiflora* (Honda) Sugimoto, l. c. 463.

Lespedeza buergeri f. *leucantha* Sugimoto, l. c. 463.

Hab. Japan and China.

f. ***angustifolia*** Makino in Bot. Mag. Tokyo 20(1906) 876.

Lespedeza buergeri var. *kinashii* Ohwi in Journ. Jap. Bot. 26(1951) 234, syn. nov.

Hab. Japan.

ssp. ***praecox*** (Nakai) Hatusima, comb. nov.

Lespedeza maximowiczii Schneid., Illus. Handb. Laubholz. 2(1907) 113, f. 70i, 71h-i².

Lespedeza friebesiana Schindl., in Fedde Repert. 9(1911) 514.

Lespedeza buergeri var. *praecox* Nakai, in Bot. Mag. Tokyo 25(1911) 55.

Lespedeza praecox Nakai ex Koidz., in Bot. Mag. Tokyo 39(1925) 24.

Lespedeza maximowiczii var. *elongata* Nakai, *Lespedeza Japan & Korea* (1927) 40.

Lespedeza densiflora Uyeki, in Nat. Hist. Soc. Corea 20(1935) 3, syn. nov.

Hab. Corea and Isl. Tsushima (Kyusyu).

f. ***tomentella*** (Nakai) Hatusima, comb. nov.

Lespedeza oldhamii var. *tomentella* Nakai in Bot. Mag. Tokyo 33(1919) 203.

Lespedeza praecox var. *tomentella* Nakai, Veg. Diamond Mt. (1918) 479b, comb. nud.

Lespedeza maximowiczii var. *tomentella* Nakai, *Lespedeza Japan & Korea* (1927) 39, fig.

Hab. Corea and Japan (Isl. Tsushima).

spp. ***tricolor*** (Nakai) Hatusima, comb. nov.

Lespedeza buergeri var. *tricolor* Nakai, Veg. Isl. Wangto (1914) 9, nom. nud.

Lespedeza oldhamii var. *tricolor* Nakai, in Bot. Mag. Tokyo 37(1927) 78.

Lespedeza maximowiczii var. *tricolor* (Nakai) Nakai, *Lespedeza Japan & Korea* (1927) 40.

Hab. S. Corea and E. China (Kiangsi: Mt. Rosan, T. Chang, no. 41, June, 1919).

L. buergeri Miq.: This species is distributed from northern Honsyu to near the southern end of Kyusyu. According to Schneider¹⁵, Schindler¹⁴, and Steward¹⁶ this also occurs widely in central China. The shape and size of leaves, and the apical forms of

the leaflets vary according to the habitat of the plants. The narrow-leaved form with patent hairs on the shoots usually grows along the banks of torrents in southwestern Japan where it is distinguished as f. *angustifolia*, and the broad-leaved form is f. *oldhamii*. The white-flowered form and a form of this broad-leaved form with purplish flowers and emarginate leaflet apices are distinguished as f. *leucantha* and f. *retusa* respectively. The white-flowered variant of the typical species is named as f. *albiflora*, and a variant with patent hairs on the shoots and rachises is var. *kinashii*, which is a synonym of f. *angustifolia*. *L. hiratsukae* described from Sanin, Japan, is, according to my examination of the type, only a form of *L. buergeri*.

The Korean form of *L. buergeri* was distinguished by Nakai as *L. maximowiczii*, the differentiation is as follows:

- A. Calyx about 2 mm. long, the lobes ovate; two flowers in the axil of each bracteole but on a common peduncle *L. buergeri*
 A. Calyx about 3-4 mm. long, the lobes with setaceously acuminate apices; two flowers in the axil of each bracteole not on a common peduncle.....*L. maximowiczii*

The length of the calyx of *L. maximowiczii* is not constant, as stated by Nakai. For instance, a specimen from Tsushima, Kyusyu has shorter calyces, about 2 mm. long. Moreover, in *L. maximowiczii* var. *tricolor* the calyx is about 2 mm. long and its lobes are acute. The character of two flowers with each bracteole being on a common peduncle or separate is not obvious in either species. But *L. maximowiczii* has purplish flowers while *L. buergeri* as well as *L. maximowiczii* var. *tricolor* has purplish-white flowers. *L. maximowiczii* has patent hairs on the shoots and rachises, but this character is also observed in *L. buergeri* f. *angustifolia*, while *L. maximowiczii* var. *tricolor* has appressed hairs. Therefore, from these observations it seems advisable to treat *L. maximowiczii* and its var. *tricolor* as geographic subspecies of *L. buergeri*. A form of *L. maximowiczii* which has dense hairs on the upper leaf-surface persisting up to autumn is distinguished as f. *tomentella*. *L. maximowiczii* var. *tricolor* differs from the typical form by its three-coloured flowers (purplish wings, white standard, and rose keels), its shining glabrate leaves, the appressed hairs on the shoots, and the shorter calyx with shorter broader and acute calyx-lobes. It is said that this variety occurs on the littoral hills of the islands in southern Korea (Isl. Wangto, Setto and Chinto) and the stems are more or less decumbent and caespitose. T. Chang No. 41 from Mt. Rosan (廬山), Kiangsi, China, preserved in the herbarium of Tokyo University, may also belong to this variety.

2. **Lespedeza formosa** (Vog.) Koehne, Deutsche Dendrolog. (1893) 343

Desmodium formosum Vogel, in Nov. Act. Acad. Caes. Leop.-Carol. **19**, suppl. (1842) 29.

Lespedeza viatorum Champ., in Journ. Bot. & Kew Gard. Misc. (1852) 4.

Lespedeza bicolor var. *intermedia* Maxim. sensu Nakai in Journ. Coll. Sci. Univ. **26** (1909) 156, p.p.; Chosen-shokubutsu (Corean plants) **1**(1914) 259, f. 309.

Lespedeza intermedia Nakai in Bot. Mag. Tokyo **37**(1923) 76.

Lespedeza bicolor var. *velutina* Nakai in Bot. Mag. Tokyo **37**(1923) 74

Lespedeza intermedia var. *angustifolia* Nakai in Bot. Mag. Tokyo **37**(1923) 77, p.p.

Lespedeza nipponica Nakai, Lespedeza Japan & Korea (1927) 23, -syn. nov.

Lespedeza japonica var. *intermedia* (Nakai) Nakai, l. c. (1927) 23.

Lespedeza japonica var. *angustifolia* (Nakai) Nakai, l. c. (1927) 25, -syn. nov.

Lespedeza japonica var. *gracilis* Nakai, l. c. (1927) 27.

Lespedeza japonica var. *retusa* Nakai, l. c. (1927) 26, -syn. nov.

Lespedeza robusta Nakai, l. c. (1927) 70, -syn. nov.

Lespedeza kiusiana Nakai, l. c. (1927) 26, fig.

Lespedeza tetraloba Nakai, in Journ. Jap. Bot. **15**(1939) 680, -syn. nov.

Lespedeza japonica var. *spicata* Nakai, in Journ. Jap. Bot. **9**(1939) 533, -syn. nov.

Lespedeza penduliflora var. *albiflora* f. *angustifolia* (Nakai) Ohwi, Fl. Jap. ed. **2**(1965) 790.

Hab. Japan, Korea, China and Formosa (along the River Dakusui, Owatari, June 1, 1898, in Herb. Univ. Tokyo).

f. **sericea** Hatusima, f. nov.

A typo differt ramuli inflorescentiae axibusque patentim villosi.

Hab. Japan: Prov. Yechigo: dry river bed near agricultural school, Takada city, S. Kurata 261, Sept. 13, 1946 (type in Herb. Facult. Agric. Tokyo Univ.); Prov. Ugo: Sazawamachi, Nishimurayama-gun, M. Okuyama, Herb. Makino 49400.

f. **versicolor** (Nakai) Hatusima, comb. nov.

Lespedeza japonica var. *versicolor* Nakai, in Bot. Mag. Tokyo **45**(1931) 121.

Lespedeza penduliflora var. *albiflora* f. *versicolor* (Nakai) Ohwi, Fl. Jap. (1963) 679.

Lespedeza thunbergii var. *albiflora* f. *versicolor* (Nakai) Ohwi, Fl. Jap. ed. **2**(1965) 790, comb. nud.

Hab. cultivated.

f. **albiflora** (Sieb.) Hatusima, comb. nov.

Desmodium racemosum var. *albiflorum* Sieb., in sched. ex Miq., in Ann. Mus. Bot. Lugd.-Bat. **3**(1867) 48, in nota sub *L. cyrtobotrya*.

Lespedeza bicolor var. *intermedia* f. *albiflora* (Sieb.) Matsum., in Bot. Mag. Tokyo **16**(1902) 69.

Lespedeza sieboldii var. *albiflora* (Sieb.) Schneid., Illus. Handb. Laubholz. **2**(1907) 113.

Lespedeza bicolor var. *albiflora* Maxim., in herb. ex Schneid., l. c. pro syn.

Lespedeza formosa var. *albiflora* Schindl., in Bot. Jahrb. **49**(1913) 582.

Lespedeza bicolor var. *alba* Bean, Trees & Shrubs Brit. Isl. **2**(1914) 16.

Lespedeza japonica Bailey, Stand. Cyc. Hort. **4**(1916) 1845, -syn. nov.

Lespedeza intermedia var. *alba* Nakai, in Bot. Mag. Tokyo **37**(1923) 77.

Lespedeza japonica var. *albiflora* Nakai, *Lespedeza Japan & Korea* (1927) 25.

Lespedeza penduliflora var. *albiflora* (Sieb.) Ohwi in Journ. Jap. Bot. **26**(1951) 234.

Lespedeza bicolor f. *alba* (Bean) Ohwi in Bull. Nat. Sci. Mus. Tokyo **33**(1953) 77.

Lespedeza thunbergii var. *albiflora* (Sieb.) Ohwi, Fl. Jap. ed. **2**(1965) 790, comb. nud.

Hab. Cultivated in Japan, but according to Nakai, it is spontaneous in Korea.

var. **australis** Hatusima, var. nov.

A typo differt racemus quam folia brevior plerumque 1-2 cm. longus, ramuli patentim villosi.

Hab. Japan: Prov. Satsuma: Mt. Nomadake, alt. 400 m., Hatusima 16421, 16433 (type); Mt. Takeyama, Yamakawa-cho, Hatusima 20917; Nagasaki-bana, Yamakawa-cho, Hatusima 16731, 22177, 22186; Noma-ike, Naito, Sept. 18, 1950; Imadake, Bōnotsu-cho, S. Sako.

var. **shiroyamensis** (Hatusima) Hatusima, comb. nov.

Lespedeza shiroyamensis Hatusima, in Journ. Jap. Bot. 38(1963) 155, fig.

Hab. Mt. Shiroyama, Kagoshima city, Kyusyu.

L. formosa (Vog.) Koehne: This name has been variously interpreted. Schneider¹² considers it as a synonym of *L. thunbergii*. The type locality of *L. formosa* is Macao in S. China. The original description of *Desmodium formosum* Vog. calls for "foliolis 3 sub-ovalibus parum emarginatis mucronatis". The leaflets in this description, however do not match those of *L. thunbergii*. *L. viatorum* Champ., originally described from Hongkong about 50 km. from Macao, though I have never seen the type, may be a synonym of *L. formosa*. *L. kiusiana* and *L. nipponica* are nothing but forms of this very variable species. The most reliable character of *L. formosa* is the presence of the dense and appressed hairs on the upper leaf-surface which persist up to autumn. So far as I am aware this species occurs from northwestern Hondo along the Japan Sea to middle Kyusyu, being especially abundant in northwestern Kyusyu and rare on the eastern side, and in Corea and central China, from Shantung to Kwangtung, also in Formosa. I follow Schindler¹⁴ and Handel-Mazzetti in retaining *L. formosa* as the oldest valid name for a group with persistent hairs as mentioned above. The sterile specimen collected by T. Owatari on June 1, 1898 along the River Dakusui (濁水) in Formosa, found among those of *L. pubescens* Hay. in the herbarium of Tokyo University, seems to belong to this species. *L. bicolor* var. *japonica*, credited to Formosa by Hosokawa², though I have never seen authentic material, may belong here. A form of this species having patent hairs on the shoots occurs in the Province of Echigo, Hondo. It may be distinguished as f. *sericea* Hatusima. Another form of this species which differs from the typical form by its racemes scarcely longer than its subtending leaves and its patent hairs is a new variety, var. *australis* Hatusima. Further variety of this species is var. *shiroyamensis* (*L. shiroyamensis*) from Mt. Shiroyama in Kagoshima city. It differs from var. *australis* by its longer racemes, its descending branches and its vibrate branchlets. A white-flowered form of *L. formosa*, generally known as *L. japonica*, is in general cultivation in gardens. Authors differ in their opinion about the systematic position of *L. japonica*. Some treat it as a variety of *L. thunbergii* or of *L. intermedia*, but Schindler¹¹ is correct in treating it as *L. formosa* var. *albiflora* (Sieb.) Schindl. Nakai records it as occurring spontaneously in Corea. I also observed this form growing wild at Kasugabaru, Fukuoka city, Kyushu.

Ricker described as new a white-flowered variety of *L. japonica*, var. *ovata* Ricker from Japan, based on S. P. T. 56524. The type of this variety was grown in America from the seed received from Takeo Kusano of Kagoshima Imperial College of Agriculture and Forestry in 1913. According to Ricker this is distinguishable from the typical form by its more compact leaves and flowers and its subulate instead of broadly acute stipules. I am not sure whether this variety is really a form of *L. formosa*, as I have had no chance to examine his type. His description of this variety calls for "leaves glabrous above". However, the leaves of true *L. japonica* are never glabrous above, so far as I could determine from examining the type in the Herbarium of Bailey Hortorium, a detached leaflet of which was so kindly sent to me by Dr. H. E. Moore, director of that herbarium. From the facts mentioned above Ricker's variety may be only a variant of either *L. inabensis* or *L. formosa* f. *albiflora*. Another form, one with two-coloured flowers, i. e. white keels and purplish standard and wings is distinguished as f. *versicolor* (Nakai) Hatusima. It is occasionally found in cultivation in gardens. However, some individuals of this form

have two kinds of branches on the same stock, some bearing white flowers, others bearing two-coloured flowers.

3. **Lespedeza maritima** Nakai, in Bot. Mag. Tokyo **37**(1923) 78; *Lespedeza* Japan & Korea (1927) 53.

Hab. S. Korea.

f. **Uyeki** (Nakai) Hatusima, comb. nov.

Lespedeza Uyeki Nakai, in Bot. Mag. Tokyo **42**(1928) 457.

Hab. S. Korea.

It is said that this *Lespedeza* occurs along the tidal line of S. Korea. Therefore, it is called in Japanese "shiohagi", meaning seashore *Lespedeza*. It differs from other species in its shorter racemes, which are about 1 cm. long, its bracteoles, each of which bears 1 flower instead of 2, its stunted habit, being only about 40 cm. high and bearing stolons, and in its dense hairs on the upper leaf-surfaces, these decreasing in autumn. According to my examination of the type of *L. Uyeki* from a similar habitat in S. Korea, it is nothing but a form of *L. maritima* with patent hairs. According to the description and figure in T. Chong's Korean Flora **1**(1957) 255, f. 506, *L. sarmentosa* Nakai ex Kawamoto (nomen nudum?) from Prov. Kokai, Korea, seems to be nothing but a form of this species.

4. **Lespedeza satsumensis** Nakai, in Bot. Mag. Tokyo **42**(1928) 456.

Lespedeza thunbergii var. *satsumensis* (Nakai) Ohwi, Fl. Jap. ed. **2**(1965) 79.

Hab. Japan: Mt. Isoma, Prov. Satsuma.

This distinct species has been variously interpreted by Japanese authors. Nakai compared it with *L. floribunda*, but I think it does not resemble that species at all. Ohwi reduced this species to a variety of *L. thunbergii*, and Kitamura reduced it to a variety of *L. nipponica* which is a synonym of *L. formosa*. This may be due to the misidentification of *L. formosa* var. *australis* which occurs in the same district as this species. It is quite different from them, but at present I cannot find its alliance in our area.

5. **Lespedeza cyrtobotrya** Miq., in Ann. Mus. Bot. Lugd.-Bat. **3**(1867) 48; Nakai, *Lespedeza* Japan & Korea (1927) 42, fig.

Lespedeza cyrtobotrya var. *pedunculata* Nakai, *Lespedeza* Japan & Korea (1927) 46.

Lespedeza cyrtobotrya var. *longiramea* Nakai, l. c. 46.

?*Lespedeza anthobotrya* Ricker in Amer. Jour. Bot. **33**(1946) 257.

Hab. Japan, Korea, Manchuria and China.

f. **kawachiana** (Nakai) Hatusima, comb. et stat. nov.

Lespedeza kawachiana Nakai, *Lespedeza* Japan & Korea (1927) 47, fig.

Lespedeza cyrtobotrya var. *kawachiana* (Nakai) Ohwi, in Journ. Jap. Bot. **26**(1951)234.

Hab. Japan.

This is well characterized by its dense racemes apparently shorter than its subtending leaves, and its acuminate calyx-lobes. A variant with patent hairs on the shoots is f. *kawachiana* (Nak.) Hatusima.

6. **Lespedeza homoloba** Nakai, in Bot. Mag. Tokyo **37** (1923) 76; *Lespedeza* Japan &

Korea (1927) 55, fig.

Lespedeza nikkoensis Nakai, l. c. (1927) 51, fig.

Lespedeza rotundiloba Nakai, l. c. (1927) 70, fig.

Lespedeza sendaica Nakai, in Bot. Mag. Tokyo **32**(1929) 449.

Hab. Japan (N. Honsyu to Isl. Yakushima).

7. **Lespedeza floribunda** Bunge, Pl. Mongol.-Chin. (1835) 13; Schindl. in Sarg., Pl. Wils. **2** (1914) 105; Steward, Manual Vasc. Pl. Lower Yantze Valley China (1958) 185.

Lespedeza formosensis Hosokawa, in Journ. Soc. Trop. Agr. Taihoku Univ. **5**(1933) 287, -syn. nov.

Hab. China and Formosa.

This is widely distributed in China and is well characterized by its leaflets with cuneate bases and with silvery and dense indumentum on the lower surface, and by its setaceous calyx lobes. In the original description of *L. formosensis* Hosokawa from Formosa the author compared this species with *L. elegans* Camb. from the Himalayas, but according to my examination of his duplicate type in Tokyo University it is nothing but a form of *L. floribunda*.

8. **Lespedeza inabensis** Nakai, in Journ. Jap. Bot. **15**(1939) 531.

?*Lespedeza albiflora* Ricker, in Amer. Journ. Bot. **33**(1946) 257.

Hab. Japan and ?China, cultivated.

In Japan two kinds of *Lespedeza* with white flowers are cultivated, one of which is *L. formosa* f. *albiflora*, which has been previously mentioned, and the other is the present species. The description of *L. inabensis* was based on a specimen cultivated in Tottori Prefecture or Province of Inaba, Hondo. At the first glance it looks like *L. formosa* f. *albiflora*, but it is readily distinguished by its glabrous upper leaf-surfaces. In the vegetative characters it looks like *L. patens* f. *macrantha*. The apices of the leaflets vary from acute to emarginate, as in some other species of *Lespedeza*. A specimen received on from the National Science Museum in Tokyo, No. 1657 (cultivated in Yamamoto, Prov. Settu, Coll. Togashi) under the name *L. japonica*, belongs to this species. I suppose that this may have been introduced into Japan in an early day from China, together with *L. thunbergii*, both of which have never been collected in the wild state in Japan. It is very interesting to note that Ricker described a white-flowered *Lespedeza* from Kwangtung, China, *L. albiflora* (Tsang 25896). His description of this species is a close match for *L. inabensis*. He supposes that this may be a hybrid between *L. thunbergii* and *L. cyrtobotrya*, or the white-flowered *L. japonica* may be involved. But I cannot agree as *Lespedeza* species rarely hybridize.

9. **Lespedeza thunbergii** (DC.) Nakai, Lespedeza Japan & Korea (1927) 15, fig.

Desmodium thunbergii DC., Prodr. **2**(1825) 337.

Desmodium penduliflorum Oudem. in Neerland's Plantentuin **2**(1866), pl. 2.

Lespedeza sieboldii Miq., in Ann. Mus. Bot. Lugd.-Bat. **3**(1867) 47, p.p.

Lespedeza bicolor var. *sieboldii* Maxim., in Acta Hort. Petrop. **2**(1873) 356, p.p.

Lespedeza penduliflora (Oudem.) Nakai, in Bot. Mag. Tokyo **27**(1923) 79.

Hab. Japan (cultivated) and China.

f. **sericea** Hatusima, form. nov.

Ramuli inflorescentiae axibusque patentim villosuli.

Hab. Cult. in the Bot. Gard. Facult. Agric. Kagoshima Univ., Aug. 1913 (type); Matsuyama, Prov. Iyo, T. Nagasawa, Herb. Nation. Sci. Mus. Tokyo No. 53860.

This is well characterized by its pendulous branches, these reaching to the ground, its lanceolate leaflets with acute apices, and its longer racemes bearing large flowers and longer pedicels. No one has collected this species in Japan in the wild state. It is noteworthy that Ricker¹⁰ and Steward¹⁶ state that this species occurs spontaneously in China in Szechuan, Kwangsi, Kiangsi, Anhwei, and Chekiang, though Schindler¹⁴ did not report it at all. If their identifications of this species are correct, *L. thunbergii* as cultivated in Japan may have been introduced from China in an early day. A form of this species with patent hairs on the shoots may be distinguished as f. *sericea* Hatusima.

10. **Lespedeza argyrophylla** Hatusima, sp. nov. Pl. 1.

Frutex 1-3 m. altus dense ramosus, ramuli angulato-striati adpresse pubescens. Foliolo terminali chartaceo, obovato-elliptico vel obovato, apice emarginato, basi acuto vel acuto-rotundato, 2-2.5 cm. longo, supra primo sparse piloso mox glabrato vel glabrescens, subtus pilis adpressis circ. 1/3 mm. longis dense vestito et argyraceo vel glauco-cinereascens, lateralibus terminali conformibus sed paulo minoribus. Petiolis circ. 1 cm. longis petiolulisque dense pubescentibus. Stipulae subulatae circ. 1 mm. longae et 1/3 mm. latae. Racemus foliis longior 4-8 cm. longus, rachis pedicellisque dense adpresse cinereo-pubescens. Pedicelli plerumque 2 mm. longi. Bracteolis ovato-triangularibus circ. 1 mm. longis. Flores circ. 1 cm. longi purpurei. Calyx supra medium 4-fidus dense pubescens circ. 4 mm. longus, lobis anguste ovatis acuminatis. Legumen oblongum apice caudato-acuminatum spura argyraceo-sericeum 9-15 mm. longum.

Hab. Japan: Kashima-mura, Isl. Koshiki, Prov. Satsuma, Kyusyu, S. Hatusima 16607 (type), 16608, Nov. 29, 1952.

This occurs rarely in Kashima-mura, Koshiki Island, Satsuma Province, Kyusyu, and a stock of this species is cultivated in the Botanical Garden of Kagoshima University. At first glance it resembles *L. homoloba*, but differs from it by its dark green leaves with grayish tomentum and densely pubescent midribs beneath, and by its larger pods attaining 10-15 mm. in length.

11. **Lespedeza liukiensis** Hatusima, sp. nov., Pl. 2.

Frutex ramosus, ramis angulato-striatis adpresse pubescentibus. Stipulae subulatae circ. 2 mm. longae. Petioli plerumque 1 cm. longi. Foliolo terminali elliptico apice emarginato plerumque 2.5-4 cm. longo, supra primo adpresse piloso mox glabrato vel glabrescens, subtus pilis adpressis circ. 1/2 mm. longis dense vestito et cinereascens. Racemus foliis longior 5-6 cm. longus, rachis pedicellisque dense cinereo-tomentellis. Bracteolae sub flores subulatae circ. 1 mm. longae. Pedicellis circ. 2 mm. longis. Flores purpurei. Calyx supra medium 4-fidus dense cinereo-pubescens circ. 4 mm. longus, lobis ovato-oblongis acutis circ. 2.5 mm. longis et 1.5 mm. latis. Corolla circ. 1 cm. longa, vexillum reflexum obtusum circ. 5-6 mm. longum.

Hab. Ryukyus: Isl. Okinawa: Nago city, cult., T. Amano 7019, Oct. 17, 1952 (type);

Ohwigawa, Nakijin-mura, T. Amano 103, Sept. 28, 1937, cult.; naturalized on the open wayside near Yagachi, Hatusima 17963, May 20, 1955. Isl. Okierabu: China-mura, K. Uyehara, Aug. 9, 1921. Isl. Tokunoshima: Ketoku, S. Sako 4221, Dec. 18-24, 1961, cult. Isl. Amami-oshima: Urakami near Naze city, naturalized, H. Ohno, mid. Nov. 1963; Oshikatsu, Chinjei-mura, K. Uyehara, Aug. 27, 1921.

This is usually cultivated as an ornamental plant in Okinawa, Okierabu, Tokunoshima and Amami-oshima in the Ryukyu Islands, but it often escapes from cultivation in such places as Ohmi-gawa, Nakijin-mura and Yagachi in Okinawa. At first glance this resembles *L. bicolor*, but differs from it by its denser greyish indumentum on the lower leaf-surface, and by its different and longer racemes. This is also near to *L. formosa*, from which it differs by its leaves with deciduous indumentum on the upper surface, this being denser beneath. Kitamura³ reports on the occurrence of *L. formosa* (*L. nipponica*) in the Ryukyus, but this may be based on a misidentification of this new species. According to a letter from E. H. Walker, he asked Ricker to examine three specimens from Okinawa which seemed to represent this species. Ricker determined one as *L. hupehensis* and the other two as intermediate between *L. thunbergii* and *L. intermedia* (*L. formosa*), but these identifications were considered doubtful by Walker. *L. hupehensis*, though I have seen no specimens, according to the description has patent hairs on the shoots. Therefore, it seems to differ from the species from the Ryukyus which has appressed hairs. Perhaps this Ryukyu species was introduced from China in an early day for ornament use.

12. *Lespedeza patens* Nakai, in Bot. Mag. Tokyo **38**(1923) 79; *Lespedeza* Japan & Korea (1927) 20, fig.

Lespedeza bicolor var. *sieboldii* f. *sericea* Matsum., in Bot. Mag. Tokyo **16**(1902) 69, p.p.

Lespedeza patens var. *acutifolia* Nakai in Bot. Mag. Tokyo **38**(1923) 79.

Lespedeza patens var. *obtusifolia* Nakai, l. c. 79.

Lespedeza penduliflora var. *sericea* (Matsum.) Ohwi, in Journ. Jap. Bot. **26**(1951) 234.

Lespedeza thunbergii var. *obtusifolia* (Nakai) Ohwi, Fl. Jap. ed. **2**(1965) 790.

Lespedeza patens var. *rotundifolia* Honda, in Bot. Mag. Tokyo **45**(1931) 422.

Hab. Japan (Prov. Uzen to Prov. Ohmi).

f. *macrantha* (Honda) Hatusima, comb. nov.

Lespedeza bicolor var. *sieboldii* f. *sericea* Matsum., in Bot. Mag. Tokyo **16**(1902) 69, pro minor parte.

Lespedeza cyrtobotrya var. *macrantha* Honda, in Bot. Mag. Tokyo **44**(1934) 671.

Lespedeza patens var. *macrantha* (Honda) Maekawa, in Bot. Mag. Tokyo **48**(1934) 52.

Lespedeza penduliflora var. *sericea* f. *pilosella* Ohwi, Fl. Jap. (1953) 679, nom. nud.

Lespedeza thunbergii var. *obtusifolia* f. *pilosella* Ohwi, Fl. Jap. ed. **2**(1965) 791, nom. nud.

Hab. Japan (Hokuriku district).

This is restricted in its distribution to northwestern Hondo, ranging from Prov. Ugo to Prov. Ohmi. Ohwi reduced this species to a variety of *L. thunbergii*, an allocation which I cannot follow. A form of this species which blossoms twice a year is known among horticulturists as *tsuyuhagi* (梅雨萩) or *nidohagi* (二度萩). The first name means the *Lespedeza* or *hagi* which blossoms in the rainy season, lasting from early June to middle July in Japan, the second the *hagi* which blossoms twice a year. This horticulturally known

form is nothing but a form of this species. A form with appressed hairs on the shoots of this species, a normal form of this species, is distinguished as f. *macrantha* (Honda) Hatusima.

13. **Lespedeza hayatae** Hatusima, nom. nov.

Lespedeza pubescens Hayata, Mater. Fl. Formos. (1911) 80; Icon. Pl. Formos. **1**(1911) 191, nec DC. non Eckl. & Zeyh.

Hab. Formosa and S. China.

The type of this species is from 1900 m. alt. on Mt. Musha, Formosa. In general appearance it resembles *L. homoloba* from Japan, but differs by its pubescent midribs on the leaves beneath. Tsang 21603 from Kwangtung, China, which was distributed under the name of *L. formosa* (determined by E.D. Merrill) and is preserved in the herbarium of Tokyo University, belongs to this species. *L. wilfordii* Ricker (Lingn. Sci. Journ. **20**(1942) 203) from Kwangtung, China, according to the description, seems very near to this species and it may prove to be identical with this Formosan species. If this surmise is proved correct, Ricker's name, published in 1942, has priority over *L. hayatae* Hatusima. *L. pubescens* Hay. can not be used because of the earlier homonyms *L. pubescens* DC. and *L. pubescens* Eckl. et Zehn.

14. **Lespedeza bicolor** Turcz., in Bull. Soc. Nat. Mosc. **18** (1840) 69; Nakai, *Lespedeza Japan & Korea* (1927) 63.

Lespedeza bicolor var. *typica* Maxim., in Act. Hort. Petrop. **2**(1872) 356.

Lespedeza bicolor var. *japonica* Nakai, in Bot. Mag. Tokyo **37**(1923) 73.

Lespedeza melanantha Nakai, in Bot. Mag. Tokyo **37**(1923) 78, -syn. nov.

Lespedeza setiloba Nakai, *Lespedeza Japan & Korea* (1927) 68, -syn. nov.

Lespedeza bicolor var. *nana* Nakai, Rep. Veg. Mt. Apoi (1930) 29.

Lespedeza melanantha var. *longifolia* Uyeki in Bull. Nat. Hist. Soc. Corea **17**(1934) 4.

Lespedeza spicata Nakai et Maekawa, in Bot. Mag. Tokyo **38**(1934) 52, with f. *acutifolia* Nakai et Maekawa.

Lespedeza inocalyx Nakai in Journ. Jap. Bot. **14**(1938) 532, syn. nov.

Lespedeza melanantha f. *rosea* Nakai, in Journ. Jap. Bot. **15**(1939) 680.

Lespedeza homoloba var. *higoensis* T. Shimizu, in Journ. Facult. Textile Sci. Technolog. Shinshu Univ. 36, ser. A. Biolog. **12**(1963) 42, f. 7, -syn. nov.

Hab. Japan (Hokkaido to Kyusyu proper), Corea, Manchuria, China, ?Formosa.

f. **tomentella** Hatusima, f. nov.

Folia supra tomentella.

Hab. Japan: Prov. Kaga: Ohsawa, Kogi-machi, Noto Peninsula, S. Hori 564, July 22, 1935 (type, in Herb. Facult. Agric. Tokyo Univ.); Hokkaido: Mt. Orokunne Nupuri, Y. Kudo, Aug. 29, 1914.

f. **patens** Nakai in sched.; Hatusima, f. nov.

Ramuli patentim villosi.

Hab. Japan: Shikoku: Shimobungoyama-mura, Prov. Awa, Aug. 5, 1935 (type, in Herb. Nat. Sci. Museum Tokyo).

f. **sericea** (Nakai) Hatusima, stat. nov.

Lespedeza bicolor var. *sericea* Nakai, *Lespedeza Japan & Korea* (1927) 66.

Hab. Corea (Isl. Daikokuzan).

L. bicolor Turcz. is well characterized by its slender and dense branchlets, its longer peduncles proportional to the rachis, its flowers congested on the upper portion of the rachis, its thinner leaves, usually turning dark when dried, and by its small nearly round pods. *L. bicolor* var. *japonica* and *L. melanantha* are only forms of this variable species. Another form of this species occurring on Kokuzanto Island off the west coast of S. Corea is densely pubescent and is distinguished as f. *sericea* (Nakai) Hatusima. A form of this species with leaves densely pubescent on the upper surface and remaining so up to autumn, may be distinguished as f. *tomentella* Hatusima. This form occurs in the Noto Peninsula of Prov. Yettyu, Hokkaido and in Prov. Awa, Shikoku. A white-flowered form of this species has been called var. *alba* Bean, but it may be a synonym of *L. formosa* f. *albiflora*, as interpreted by Rehder.

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Pl. 1. *L. argyrophylla* Hatusima (type)



Pl. 2. *L. liukiensis* Hatusima (type)