

New hybrids in *Lespedeza* section *Macrolespedeza* (Leguminosae)

Shinobu Akiyama

Department of Botany, National Science Museum,
Amakubo 4-1-1, Tsukuba, 305-0005 Japan
E-mail: akiyama@kahaku.go.jp

Abstract New natural hybrids, *Lespedeza* × *bicolor* S. Akiyama, (putative parents are *L. bicolor* Turcz. and *L. homoloba* Nakai), and *L.* × *cyrtoloba* S. Akiyama, (putative parents are *L. cyrtobotrya* Miq. and *L. homoloba* Nakai), are described and illustrated. The floral characters of the hybrids show intermediacy between those of their respective parents.

Key words: *Lespedeza*, *Macrolespedeza*, natural hybrid.

Introduction

Interspecific natural hybrids in *Lespedeza* section *Macrolespedeza* have been reported by several workers (Lee, 1965; Akiyama & Ohba, 1982, 1983a, 1983b; Akiyama, submitted). Akiyama and Ohba (1982) distinguished *L.* × *cyрто-buergeri* from its putative parental species, *L. buergeri* Miq. and *L. cyrtobotrya* Miq. It was clear that the intermediate floral and vegetative characters and low stainability of pollen grains are good indicators of hybridity. Akiyama and Ohba (1983a) also reported a population consisting of putative hybrids between *L. homoloba* and *L. kiusiana* (= *L. formosa* subsp. *velutina*) from Okayama Prefecture, western Honshu. In that example the putative hybrids showed a wide range of variation in floral and vegetative characters and in pollen stainability. Although the population was suspected of being a hybrid swarm with wide variation, the intermediate floral and vegetative characters were good indicators of hybridization.

During my studies of *Lespedeza* I discovered a population containing individuals that were intermediate between *L. bicolor*, *L. cyrtobotrya* and *L. homoloba* in Gunma Prefecture, central Honshu. In a previous paper (Akiyama, submitted) I described *L.* × *miquelii* as a putative hybrid between *L. bicolor* and *L. cyrtobotrya*. Two additional intermediate plants, between *L. bicolor*

and *L. homoloba*, and between *L. cyrtobotrya* and *L. homoloba*, are also considered to be hybrids. I found similar intermediate plants in several populations containing *L. homoloba* and *L. bicolor* and/or *L. cyrtobotrya* and in some previously collected specimens, all of which I suspected to be hybrids. To clarify the identity of these plants, the floral and vegetative characters were examined in detail.

Taxonomic treatment and discussions

(1) *Lespedeza* × *bicolor* S. Akiyama, hybrid nov. [Figs. 1 and 2]

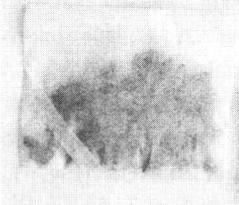
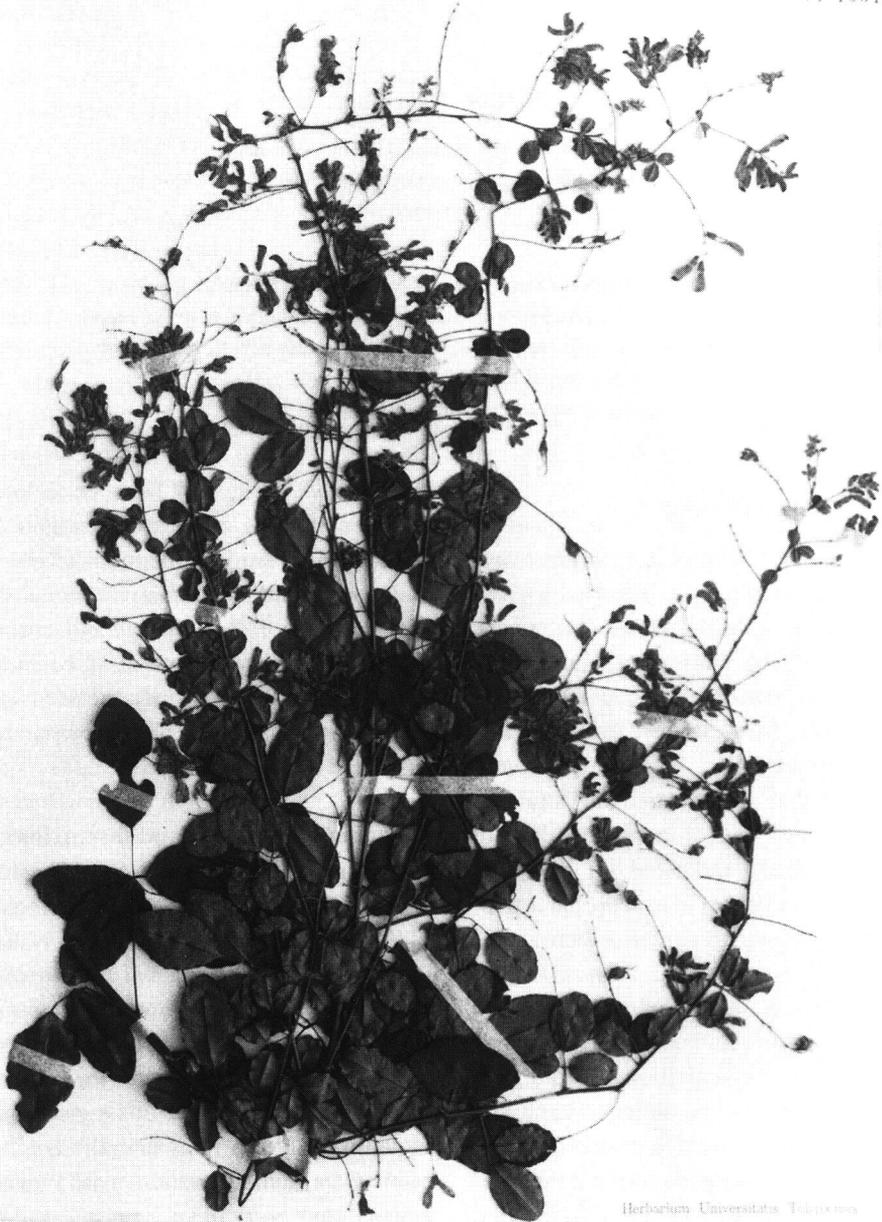
L. bicolor Turcz. × *L. homoloba* Nakai

Hybrida putativus inter *L. bicoloram* Turcz. et *L. homolobam* Nakai in sect. *Macrolespedeza*. Planta inter *L. bicoloram* Turcz. et *L. homolobam* Nakai quasi intermedia in floribus. Inflorescentia floribus sparse disposita et longiore quam folio subtento. Calycem lobis lateralibus ellipticis vel ovatis. Vexillum obovatum, basi indistincte unguiculatum, auriculis anguste reniformibus, longius quam carina alisque, his brevissimis. Lamina alae anguste oblonga.

The inflorescences in *Lespedeza* × *bicolor* are longer than the subtending leaf and have 4–12 sparsely arranged flowers (Fig. 1). The flowers are illustrated in Fig. 2. The calyces are 3.2–3.6 mm long, tubular, 4-lobed nearly to the middle; tube 1.7–2.1 mm long; lobes subequal in length (or the lower one longest); lateral lobes

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Lespedeza × bicoloba S. Akiyama

Shinobu AKIYAMA (National Science Museum, Tokyo)
1983. 8. 26

Herbarium Universitatis Tokyensis

Lespedeza bicoloba Turcz.
× *L. bicolor* Nakaii

No. 1331481
 Date 26 Aug. 1983
 Loc. H. Ohba & S. Akiyama / 520
 Collector H. Ohba & S. Akiyama
 S. Akiyama

Fig. 1. Holotype of *Lespedeza × bicoloba* S. Akiyama (H. Ohba & S. Akiyama 1520, TI).

1.4–1.8 mm long, 0.7–1 mm wide, elliptic to ovate, apex acute. The standard is longer than the wing and keel petals, and the wings are shorter than the keel petals ($S > K > W$). The standard is obovate, 8.5–10.3 mm long, 4.5–5.3 mm wide, base attenuate and indistinctly clawed, apex round or slightly retuse; auricles narrowly reniform. The wings are 7.6–9 mm long and distinctly clawed; lamina narrowly oblong, 4.7–5.4 mm long, 1.3–1.7 mm wide, upper basal part auriculate; claw 2.9–3.7 mm long. The keel petals are 8.5–10 mm long, with distinct claw; lamina narrowly obovate, 5.3–6 mm long, 1.8–2.5 mm wide; claw 3.2–4.2 mm long.

Type: Japan. Honshu, Gunma Pref., Tone-gun, Shirasawa-mura, Namae, alt. ca. 550 m (H. Ohba & S. Akiyama, 1520, T1-holotype).

Other specimens examined: Japan. Honshu, Gunma Pref., Tone-gun, Shirasawa-mura, Namae, alt. ca. 550 m (H. Ohba & S. Akiyama, 1521, 1522, 1523, T1); Tone-gun, Shirasawa-mura, Takahira, alt. ca. 500 m (H. Ohba & S. Akiyama 1557, T1); Tone-gun, Minakami-machi, Yubiso, alt. ca. 600 m (H. Ohba & S. Akiyama 1575, T1).

Japanese name: Yamatsukushi-hagi (nov.).

The characters distinguishing *L. bicolor* Turcz. from *L. homoloba* Nakai are the shape of the standard, the auricles of the standard, the lamina of the wing and the calyx lobes (Akiyama, 1988). The standard is obovate with the attenuate base of *L. bicolor*, but with the distinct claw of *L. homoloba*. The auricles of the standard are lunate in *L. bicolor*, but reniform in *L. homoloba*. The lamina of the wing is narrowly obovate to obo-

vate in *L. bicolor*, but narrowly oblong in *L. homoloba*. The lateral calyx lobes are ovate or triangular-lanceolate in *L. bicolor*, but widely elliptic to elliptic in *L. homoloba*.

The flowers of the hybrid plants appear intermediate between *L. bicolor* and *L. homoloba* and are rather constant (Table 1). The intermediate plants are considered to be hybrids between *L. bicolor* and *L. homoloba* and are here named *L. × bicolora*.

It is noteworthy that *L. × bicolora* has leaves that are intermediate (H. Ohba & S. Akiyama nos. 1523, 1575) or more similar to those of *L. homoloba* than to *L. bicolor* (H. Ohba & S. Akiyama 1520, 1521, 1522, 1557).

This hybrid can be expected to occur wherever *L. bicolor* and *L. homoloba* grow together.

(2) *Lespedeza × cyrtoloba* S. Akiyama, hybrid nov. [Figs. 3, 4 and 5]

L. cyrtobotrya Miq. × *L. homoloba* Nakai

Hybrida putativus inter *L. cyrtobotryam* Miq. et *L. homolobam* Nakai in sect. *Macrolespedeza*. Planta inter *L. cyrtobotryam* Miq. et *L. homolobam* Nakai quasi intermedia in floribus. Inflorescentia floribus compacte vel sparse ornata et brevior vel longior quam folio subtento. Calycem lobis lateralibus ovatis, apice acuti- vel brevi-acuminatis. Vexillum obovatum, base indistincte unguiculatum, auriculis anguste reniformibus, longius quam alis carinaeque; uterque plusminusve aequilongis. Lamina alae anguste oblonga vel anguste obovate.

The inflorescences in *Lespedeza × cyrtoloba* are longer than the subtending leaf and have

Table 1. Distinguishing characters among *L. bicolor*, *L. homoloba*, and *L. × bicolora*.

Character	<i>L. bicolor</i>	<i>L. × bicolora</i>	<i>L. homoloba</i>
Shape of standard	obovate, base attenuate	obovate, base attenuate and indistinctly clawed	with distinct claw; lamina elliptic to ovate
Shape of auricles of standard	lunate	narrowly reniform	reniform
Shape of lamina of wing	narrowly obovate to obovate	narrowly oblong	narrowly oblong
Shape of lateral calyx lobe	ovate or triangular-lanceolate	elliptic to ovate	widely elliptic to elliptic

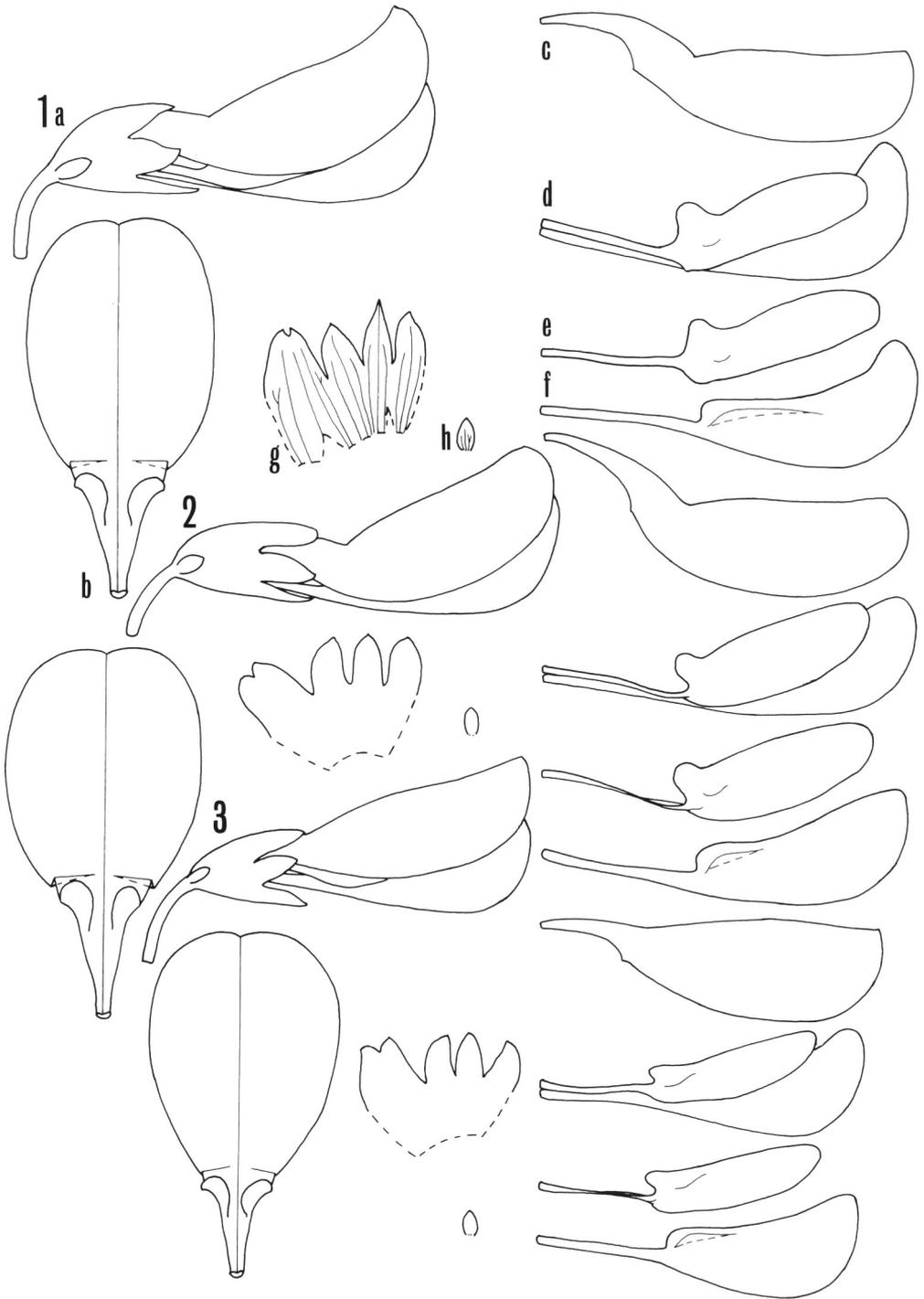


Fig. 2. Flowers of *Lespedeza* \times *bicolora* S. Akiyama. 1: H. Ohba & S. Akiyama 1520, holotype. 2: H. Ohba & S. Akiyama 1521. 3: H. Ohba & S. Akiyama 1522. 4: H. Ohba & S. Akiyama 1523. 5: H. Ohba & S. Akiyama 1557. 6: H. Ohba & S. Akiyama 1575. a: Flower, lateral view. b: Standard, opened. c: Standard, lateral view. d: Wing and keel-petal. e: Wing. f: Keel-petal. g: Calyx, dissected. h: Bracteole. Bar=5 mm.

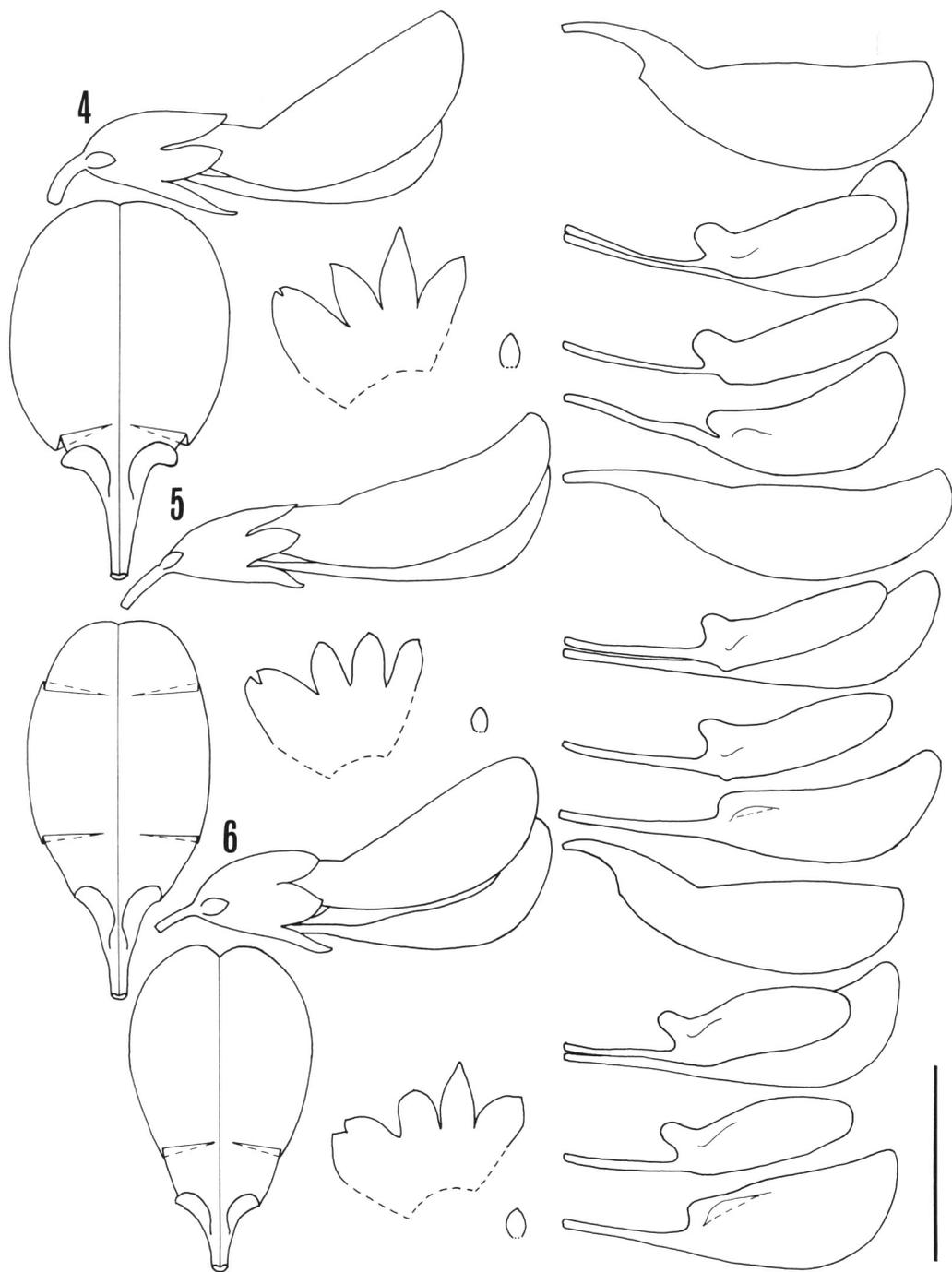


Fig. 2. (Continued)

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Fig. 3. Holotype of *Lespedeza × cyrtoloba* S. Akiyama (H. Ohba & S. Akiyama 3135, TI).

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Fig. 4. *Lespedeza* × *cyrtoloba* S. Akiyama (H. Ohba & S. Akiyama 3130, TI).

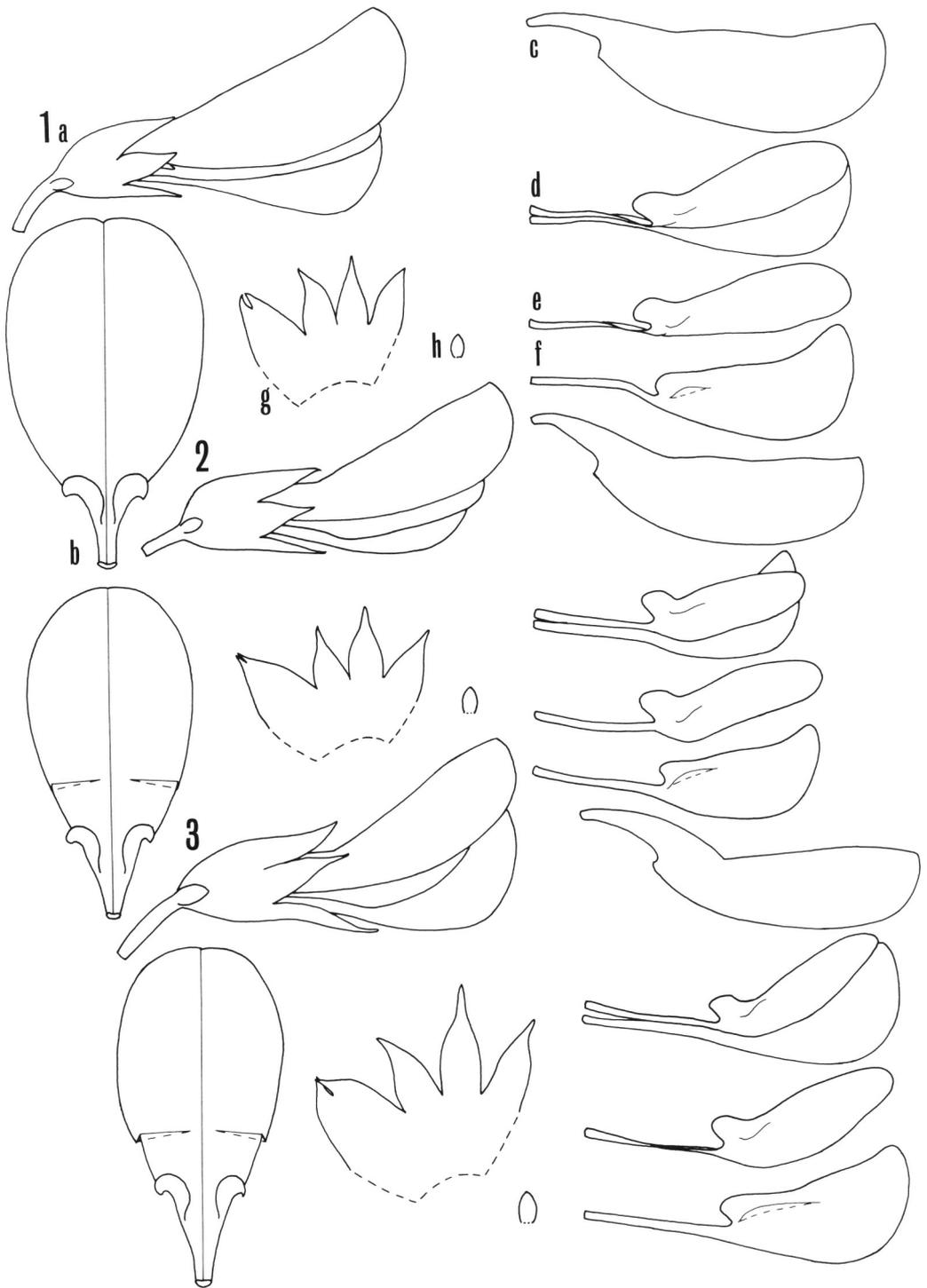


Fig. 5. Flowers of *Lespedeza* \times *cyrtoloba* S. Akiyama. 1: H. Ohba & S. Akiyama 3135, holotype. 2: H. Ohba & S. Akiyama 3129. 3: H. Ohba & S. Akiyama 3130. 4: H. Ohba & S. Akiyama 1555. 5: H. Ohba & S. Akiyama 1558. 6: H. Ohba & S. Akiyama 2087. a: Flower, lateral view. b: Standard, opened. c: Standard, lateral view. d: Wing and keel-petal. e: Wing. f: Keel-petal. g: Calyx, dissected. h: Bracteole. Bar=5 mm.

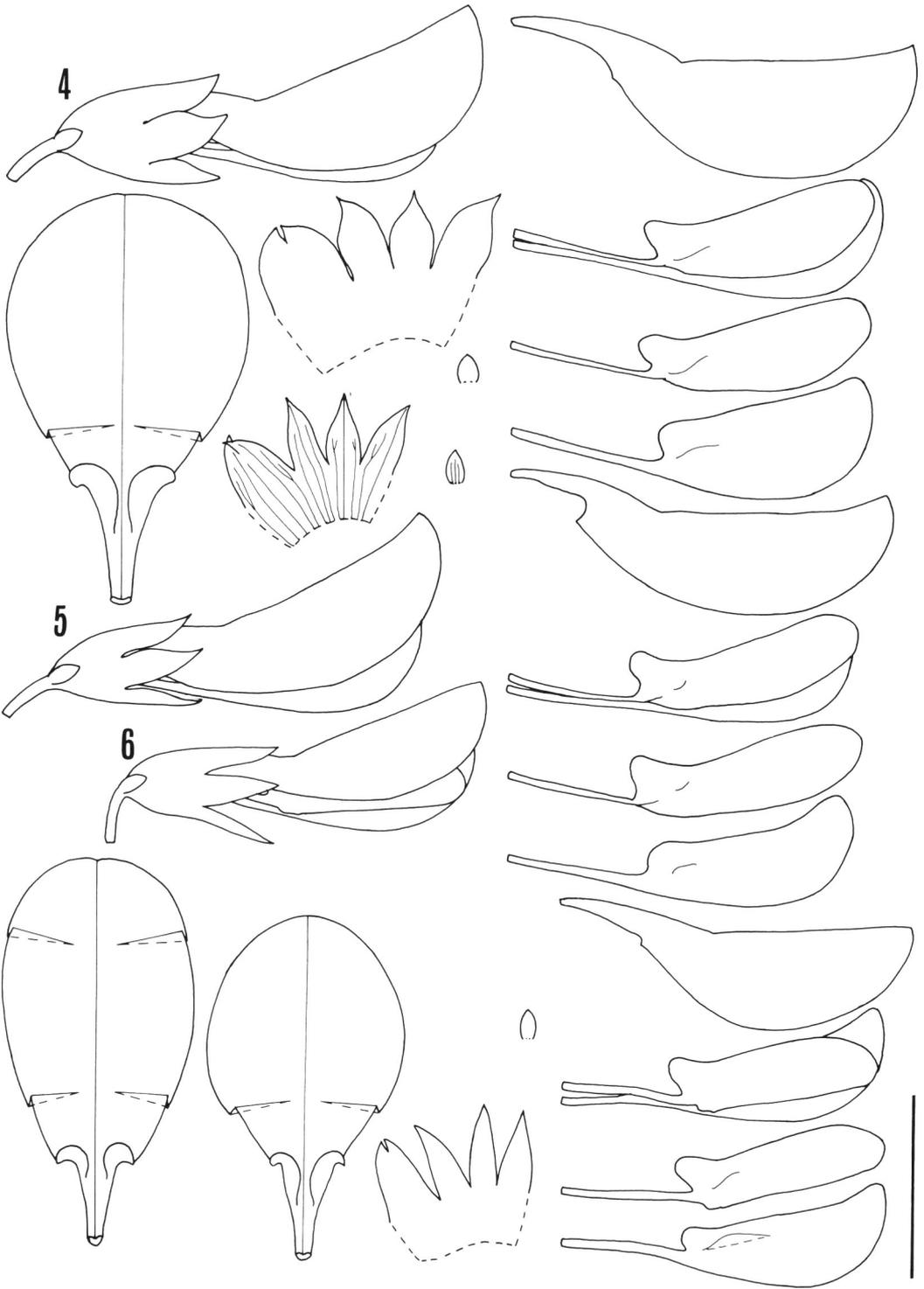


Fig. 5. (Continued)

4–8(–12) sparsely arranged flowers (Fig. 3), or shorter than the subtending leaf and have 4–8(–12) compactly arranged flowers (Fig. 4). The flowers are illustrated in Fig. 5. The calyces are 3.6–4.6 mm long, tubular, 4-lobed nearly to the middle; tube 1.6–2.3 mm long; lobes subequal in length; lateral lobes 1.6–2.4 mm long, 0.8–1.3 mm wide, ovate, apex acute to short acuminate. The standard is longer than the wing and keel petals, and the wings and the keel petals are nearly equal in length ($S > W = K$). The standard is obovate, 9–11.5 mm long, 4.4–6.5 mm wide, base attenuate and indistinctly clawed, apex round or slightly retuse; auricles narrowly reniform. The wings are 7.8–10.2 mm long and distinctly clawed; lamina narrowly oblong to narrowly obovate, 4.6–6.4 mm long, 1.2–2.2 mm wide, upper basal part auriculate; claw 3.3–3.9 mm long. The keel petals are 7.7–9.5 mm long, with a distinct claw; lamina narrowly obovate, 4.3–6 mm long, 2–2.7 mm wide; claw 3.4–4.2 mm long.

Type: Japan. Honshu, Gifu Pref., Toki-shi, Obora-Kujiri, alt. 100–200 m (H. Ohba & S. Akiyama 3135, T1-holotype).

Other specimens examined: Japan. Honshu. Gunma Pref., Tone-gun, Shirasawa-mura, Takahira, alt. ca. 500 m (H. Ohba & S. Akiyama 1555, 1558, T1). Yamanashi Pref., Mitsu-toge (S. Okuyama 24081, TNS). Gifu Pref., Toki-shi, Obora-Kujiri, alt. 100–200 m (H. Ohba & S.

Akiyama 3129, 3130, T1). Shimane Pref., Nogi-gun, Hirose-machi, Fube (H. Ohba & S. Akiyama 2087, T1).

Japanese name: Marubatsukushi-hagi (nov.).

The characters distinguishing *L. cyrtobotrya* Miq. from *L. homoloba* Nakai are the shape of the standard and the auricles of the standard, the length of the wing and keel petals, the shape of the lamina of the wing, the shape of the calyx lobes, and features of the inflorescence (Akiyama, 1988). The wing is longer than the keel petal in *L. cyrtobotrya*, but shorter in *L. homoloba*. The standard is obovate with an attenuate base in *L. cyrtobotrya*, but distinctly clawed in *L. homoloba*. The auricles of the standard are lunate in *L. cyrtobotrya*, but reniform in *L. homoloba*. The lamina of the wing is narrowly obovate to obovate in *L. cyrtobotrya*, but narrowly oblong in *L. homoloba*. The lateral calyx lobes are triangular-lanceolate with the apex acuminate in *L. cyrtobotrya*, but elliptic and obtuse or acute (not acuminate) in *L. homoloba*. The inflorescence has 4–10 compactly arranged flowers in *L. cyrtobotrya*, and 4–12 sparsely arranged flowers in *L. homoloba*. The inflorescence is usually shorter than the subtending leaf in *L. cyrtobotrya* and longer in *L. homoloba*.

The flowers of the plants here named *Lespedeza* × *cyrtoloba* appear intermediate between *L. cyrtobotrya* and *L. homoloba* and are rather constant in their features (Table 2). These inter-

Table 2. Distinguishing characters among *L. cyrtobotrya*, *L. homoloba*, and *L. ×cyrtoloba*.

Character	<i>L. cyrtobotrya</i>	<i>L. ×cyrtoloba</i>	<i>L. homoloba</i>
Shape of standard	obovate, base attenuate	obovate, base attenuate and indistinctly clawed	with distinct claw; lamina elliptic to ovate
Shape of auricles of standard	lunate	narrowly reniform	reniform
Length of wing and keel petals	wing longer than keel petals	wing and keel petals nearly equal	wing shorter than keel petals
Shape of lamina of wing	narrowly obovate to obovate	narrowly oblong to narrowly obovate	narrowly oblong
Shape of lateral calyx lobe	triangular-lanceolate, apex acuminate	ovate, apex acute to short acuminate	elliptic, apex obtuse or acute
Inflorescence	4–10 compactly arranged flowers, usually shorter than the subtending leaf	4–8(–12) sparsely or compactly arranged flowers, shorter or longer than the subtending leaf	4–12 sparsely arranged flowers, usually longer than the subtending leaf

mediate plants are considered to be a hybrid between *L. cyrtobotrya* and *L. homoloba*.

It is interesting that *L. ×cyrtoloba* can be separated into two forms based on vegetative features. One form has leaves resembling those of *L. homoloba* (H. Ohba & S. Akiyama nos. 1555, 1558, 3135), the other has leaves resembling those of *L. cyrtobotrya* (H. Ohba & S. Akiyama nos. 2087, 3129, 3130; S. Okuyama no. 24081). The former also has the inflorescences resembling that of *L. homoloba* and the latter has an inflorescence resembling that of *L. cyrtobotrya*. The holotype represents the former type and has leaves quite similar to those of *L. homoloba*.

This hybrid can be expected to occur wherever *L. cyrtobotrya* and *L. homoloba* grow together.

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References

- Akiyama, S., 1988. A revision of the genus *Lespedeza* section *Macrolespedeza* (Leguminosae). *The University Museum, The University of Tokyo, Bulletin* no. 33, 1–170, pls. 1–27 (simultaneously published by University of Tokyo Press, Tokyo).
- Akiyama, S. A new hybrid, *Lespedeza ×miquelii*, in *Lespedeza* section *Macrolespedeza* (Leguminosae). *J. Jap. Bot.* (submitted).
- Akiyama, S. and H. Ohba, 1982. Studies on hybrids in the genus *Lespedeza* sect. *Macrolespedeza* (1) A putative hybrid between *L. buergeri* Miq. and *L. cyrtobotrya* Miq. *J. Jap. Bot.*, **57**: 232–240.
- Akiyama, S. and H. Ohba, 1983a. Studies on hybrids in the genus *Lespedeza* sect. *Macrolespedeza* (2) A hybrid swarm between *L. homoloba* Nakai and *L. kiusiana* Nakai. *J. Jap. Bot.*, **58**: 97–104.
- Akiyama, S. and H. Ohba. 1983b. Studies on hybrids in the genus *Lespedeza* sect. *Macrolespedeza* (3) A putative hybrid between *L. buergeri* Miq. and *L. satsumensis* Nakai. *J. Jap. Bot.*, **57**: 248–252.
- Lee, T. B. 1965. The *Lespedeza* of Korea (1). *Bull. Seoul Nat. Univ. For.*, no. 2, 1–34.

