A taxonomic revision of the *Boehmeria spicata* complex (Urticaceae) in Korea

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ABSTRACT: Seven species and two varieties belonging to the genus *Boehmeria* Jacq. (Urticaceae) are known to be distributed in Korea. Among them, *B. spicata*, *B. tricuspis*, and *B. tricuspis* var. *unicuspis* were subjected to an external morphological study. Among the individuals believed to exhibit variations in the leaf shape, *B. gracilis* and *B. silvestrii* were newly recognized. Unlike related taxa, *B. gracilis* has middle leaves with an elliptic, broadly elliptic, ovate, or broadly depressed ovate shape, a regular and serrulate-dentate margin, and an unlobed and short caudate or cuspidate apex. *Boehmeria silvestrii* has middle leaves with 5-angled ovate, orbicular ovate or broadly ovate shapes, and 3- or 5-lobed and caudate apices. Therefore, we assigned the corresponding names ‘Top-geo-buk-kko-ri’ and ‘Cham-geo-buk-kko-ri’. Meanwhile, the *B. spicata* complex (*B. gracilis*, *B. silvestrii*, *B. spicata*, and *B. tricuspis* var. *unicuspis*) is very closely related in terms of the morphological characters, whereas *B. tricuspis* exhibits no relationship. Furthermore, because the scientific name and type specimen of *B. tricuspis* var. *unicuspis* (Pul-geo-buk-kko-ri) are problematic, the correct name *B. paraspicata* Nakai and corresponding holotype are presented. Additionally, lectotypes of *B. gracilis* and *B. silvestrii* are newly designated here. A taxonomic treatment, descriptions, a key, photographs, type specimens, and leaf variation images of the *B. spicata* complex are provided in this study.

Keywords: *Boehmeria*, *B. gracilis*, *B. paraspicata*, *B. silvestrii*, *B. spicata*, lectotypification

The genus *Boehmeria* Jacq. is one of the largest genera belonging to the family Urticaceae (Gaudichaud, 1830; Weddell, 1856, 1869; Wilmot-Dear and Friis, 2013). The genus is composed of approximately 100–150 species and is distributed in the tropics and subtropics (East Africa, Indian Ocean Islands, East to West Asia, Oceania, Pacific Ocean Islands, and North to South America). In particular, many species are distributed from the Himalayas to Indochina (Weddell, 1856; Blume, 1857; Jackson, 1895; Pinner and Bence, 1987; Ivesossal-Pfaffli, 1995; Wilmot-Dear and Friis, 1996, 2013; Kozłowski, 2012). Approximately 44–75 species of this genus are distributed in Asia (Yahara, 1981; Zhao et al., 2003; Pierozzi et al., 2008). In Korea, seven species and two varieties of this genus are distributed (Liang, 2009; Kim, 2018). Among them, *B. spicata* (Thunb.) Thunb., *B. tricuspis* (Hance) Makino, and *B. tricuspis* var. *unicuspis* Makino are the most confusing, as the boundary of the leaf variation is unclear.

Meanwhile, *B. tricuspis* is generally confused with *B. silvestrii* (Pamp.) W. T. Wang because the apex of the leaf is similar to a 3-lobed shape (Makino, 1940, 1961, 1989; Ohwi, 1953, 1965; Kitamura and Murata, 1961; Im, 1996; Lee, 1996a, 1996b; Lee, 2003; Tateishi, 2006; Liang, 2009; Wilmot-Dear and Friis, 2013). The distribution of *B. silvestrii* in Korea was mentioned for the first time by Makino (1989).

*Boehmeria gracilis* C. H. Wright is also known to be distributed in Korea (Makino, 1989), and it is often confused with *B. spicata* and *B. tricuspis* var. *unicuspis*. In China, Chen et al. (2003) considered *B. gracilis* and *B. tricuspis* var.

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There was taxonomic confusion due to leaf variations and no distinct difference in the reproductive organs (e.g., inflorescence shape, male flower shape, achene hair) were observed with a microscope (AX-70, Olympus, Tokyo, Japan; DP2-BSW, Olympus) and with a digital caliper (CD-15CPX, Mitutoyo, Kawasaki, Japan).

### Taxonomic Treatment

1. **Boehmeria gracilis** C. H. Wright, J. Linn. Soc., Bot. 26: 485, 1899.—TYPE: China. Hubei, Patung, Ichang, May 1888, A. Henry 4692 (lectotype: K, photo!, designated here, see Fig. 1A); Hubei, 1885–1888, A. Henry 4692 (syntype: GH, photo!); Hubei, Patung, Ichang, May 1888, A. Henry 4728 (syntype: K, photo!); Hubei, Changlo, Mar 1889, A. Henry 6258 (syntype: K, photo!).

   *B. tricuspid var. unicuspis* Makino, Ill. Fl. Nippon. 641, 1940, **nom. nud.**; *B. tricuspid var. unicuspis* Makino ex Ohwi, Fl. Jap. 441, 1953.

**Korean name:** Top-geo-buk-kko-ri (톱거북꼬리, new common name).

### Materials and Methods

The literature was reviewed and fieldwork was conducted from 2016 to 2020 in Korea. Voucher specimens were deposited in the herbarium of Andong National University (ANH) (Appendix 1). Herbarium specimens of KB, KH, TI, and WFRC and specimen images of BM, FI, GH, K, LD, LINN, MNHN, P, PE, and UPS were also examined. The qualitative and quantitative morphological characters of the vegetative organs (e.g., habit type, plant hair, leaf shape) and reproductive organs (e.g., inflorescence shape, male flower shape, achene hair) were observed with a microscope (AX-70, Olympus, Tokyo, Japan; DP2-BSW, Olympus) and with a digital caliper (CD-15CPX, Mitutoyo, Kawasaki, Japan).
Fig. 1. Types of the *Boehmeria spicata* complex. A. *B. gracilis* (lectotype: A. Henry, 4692, K, designated here). B. *B. paraspicata* (holotype: T. Nakai s.n., TI). C. *B. silvestrii* (lectotype: P. C. Silvestri 4070, FI, designated here). D. *B. spicata* (lectotype: C. P. Thunberg 22115, UPS).
veins and veinlets, often thin membranous or chartaceous. **Inflorescences** axillary; stamine inflorescences unbranched or branched in proximal axils, 15.5–17.2 cm long, rachis 1.0–1.3 mm in diam.; pistillate inflorescences unbranched in distal axils, 7.7–18.1 cm long, rachis 0.3–0.5 mm in diam., loosely glomerules at flowering, relatively densely glomerules at fruiting. **Flowers** unisexual; male flowers 4-merous, rarely 3- or 5-merous, 3.1–4.9 mm in diam.; pedicels 0.2–1.2 mm long, red or green; perianth lobes cleft near to the middle, convex, elliptic, 0.9–1.2 mm long, 1.0–1.2 mm wide, red or yellow green, strigillose in outside; filaments 4, rarely 3 or 5, linear, inflexed, 3.1–4.9 mm long, white; anthers basifixed, 0.8–1.1 mm wide, 1.0–1.2 mm long, red or green; perianth lobes cleft near to the middle, convex, ovate, or broadly ovate, 1.2–1.4 mm long, 0.7–1.3 mm long, 0.6–1.0 mm wide; wings yellow green, strigillose with uncinate hair; necks 2-toothed; tubes obovoid, 1.0–1.4 mm long, 0.7–1.6 mm wide, red or clavate; female flowers 3.6–4.0 mm long, sessile; perianth 1.2 mm long, 0.8–1.2 mm wide, white; ovaries rudimentary, inflexed, 3.1–4.9 mm long, white; anthers basifixed, 0.8–1.1 mm wide, 1.0–1.2 mm long, red or green; perianth lobes cleft near to the middle, convex, or 5-merous, 3.1–4.9 mm in diam.; pedicels 0.2–1.2 mm long, strigillose with uncinate hair throughout the surface.

**Distribution:** Korea (all provinces except Jejudo and Ulleungdo Islands), China, Japan. **Phenology:** Flowering July to September, Fruiting September to November. **Chromosome number:** 2n = 28 (Yahara, 1983). **Habits** subshrub, monoecious or dioecious. **Stems** erect, 0.8–1.1 m tall, 1.8–4.1 mm in diam., a few branched from the base, green or red, sparsely strigillose or subglabrous. **Leaves** opposite, pairs subequal in size; stipules lanceolate, 8.2–14.7 mm long, 1.4–3.5 mm wide, yellow green, sparsely pubescent along midvein on abaxial surface; petioles 3.8–12.1 cm long, 0.8–1.7 mm in diam., green or red, sparsely strigillose or subglabrous; middle leaf blades ovate to broadly ovate, 9.0–19.1 cm long, 7.4–16.2 cm wide, base broadly cuneate, margin serrate-dentate, gradually larger distally, teeth 6–14 on each side, narrowly triangular to triangular, 6.4–9.9 mm long, 7.2–10.6 mm wide, apex unlobed, caudate or narrowly acute, adaxial surface green, sparsely strigillose, densely cistolths
Fig. 2. Photographs of *Boehmeria gracilis*. A. Habit. B. Underground structure. C. Base stem. D. Middle stem. E. Adaxial surface of stipule. F. Abaxial surface of stipule. G. Middle leaf. H. Adaxial surface of leaf. I. Abaxial surface of leaf. J. Staminate inflorescence (left: unbranched, right: branched). K. Bud of male flower. L. Male flower. M, N. Pistillate inflorescence at flowering. O. Female flower. P. Pistillate inflorescence at fruiting. Q. Achene. R. Seeds.
punctiform, midvein convex, abaxial surface yellow green, sparsely strigillose with uncinate hair or subglabrous along veins and veinlets, often thin membranous or chartaceous. **Inflorescences** axillary; staminate inflorescences unbranched or rarely branched in proximal axils, 5.9–28.5 cm long, rachis 0.2–1.1 mm in diam.; pistillate inflorescences unbranched in distal axils, 9.4–23.7 cm long, rachis 0.3–0.9 mm in diam., loosely glomerules at flowering, relatively densely glomerules at fruiting. **Flowers** unisexual; male flowers 4-merous, rarely 5-merous, 4.0–5.2 mm in diam.; pedicels 0.2–1.6 mm long, green or red; perianth lobes cleft near to the middle, convex, elliptic, 0.9–1.2 mm long, 0.9–1.1 mm wide, yellow green or red, strigillose in outside; filaments 4, rarely 5, linear, inflexed, 1.7–2.2 mm long, white; anthers basifixed, 0.7–1.0 mm long, 0.7–0.9 mm wide, yellow green or red, ovoid in outside; ovaries rudimentary, clavate; female flowers 2.6–3.3 mm long, sessile; perianth tubes obovoid, 1.3–1.7 mm long, 0.6–1.0 mm wide, yellow green or red, strigillose with uncinate hair; necks 2-toothed; styles 1, linear, plumose, 0.8–2.0 mm long, white or red; stamens absent. **Achenes** rhomboid or obovoid, compressed, 2.5–4.0 mm long, 2.2–3.3 mm wide, base cuneate, irregular strigillose with uncinate hair throughout the surface. **Seeds** elliptic or subcircular, 1.0–1.7 mm long, 0.8–1.6 mm wide; wings rhomboid-obovoid or broadly obovoid, 0.7–1.0 mm long, 0.6–0.8 mm wide. **Chromosome number:** $2n = 28$ (Okabe, 1963; Yahara, 1983).

**Phenology:** Flowering July to September, Fruiting September to November.

**Distribution:** Korea (all provinces), China, Japan.

**Taxonomic note:** Nakai (1930) first reported a new species, *B. paraspicata* Nakai. This name was accompanied by a Japanese diagnosis without a type specimen in the flora of Mt. Apoi in Prov. Hidaka on Hokkaido. Later, Satake (1936) recognized *B. paraspicata* as a *nomen nudum*, and he

![Fig. 3. Middle leaf variations of the *Boehmeria spicata* complex. A. *B. gracilis*. B. *B. paraspicata*. C. *B. silvestrii*. D. *B. spicata*.](image-url)
republished it with an accompanying Latin description and a specimen collected from Mt. Kanayama in Prov. Isikari on Hokkaido in August 1916 by G. Koidzumi (in TI herbarium). Among the examined specimens, there was a specimen that was assumed to have been collected when Nakai published B. paraspicata. Nakai’s specimen and Koidzumi’s specimen allowed confirmation that the characters of the habit, stem, leaf, and inflorescence are identical. Furthermore, in 1928, before the announcement of the new species, the specimen was annotated as ‘B. paraspicata Nakai’. Moreover, the collection site and the collector were in good agreement with the protologue of Nakai (Fig. 1B). As a result, Satake (1936) knew that there was an original material of Nakai, but he recognized the specimen of Koidzumi collected earlier as the type specimen. However, the specimen of Nakai has priority because B. paraspicata is not a name based on the specimen of Koidzumi. Thus, B. paraspicata Nakai ex Satake, published based on the Koidzumi’s specimen, is a later homonym of B. paraspicata Nakai according to Art. 53.1 of the Shenzhen code (Turland et al., 2018). Therefore, we present a holotype to avoid confusion regarding the type specimen (Fig. 1B).

This taxon is clearly distinguished from B. silvestrii by the unlobed apex of the leaf and from B. gracilis based on the broadly ovate shape of the middle leaf, the serrate-dentate margin of the leaf, the gradually larger teeth distal of the leaf, and the caudate or narrowly acute apex of the leaf (Figs. 3, 4, and Table 2).

3. **Boehmeria silvestrii** (Pamp.) W. T. Wang, Acta Phytotax. Sin. 20: 204, 1982; *B. plataniifolia* (Franch. & Sav. ex Maxim.) C. H. Wright var. *silvestrii* Pamp., Nuovo Giorn. Bot. Ital. n. s. 22: 278, 1915; *B. japonica* (L. f.) Miq. var. *silvestrii* (Pamp.) Friis & Wilmot-Dear, Blumea. 58: 191, 2013.—TYPE: China. Hubei, 1912, P. C. Silvestri 4070 (lectotype: FI, photo!, designated here, see Fig. 1C). 4070a (islectotype: FI, photo!, designated here).

**Korean name:** Cham-geo-buk-kko-ri (참거북꼬리, new common name).

**Habits** subshrub, monoecious or dioecious. **Stems** erect, 0.8–1.4 m tall, 1.9–3.6 mm in diam., a few branched from the base, green or red, sparsely strigillose or subglabrous. **Leaves** opposite, pairs subequal in size; stipules narrowly lanceolate, 8.6–13.1 mm long, 1.7–3.2 mm wide, yellow green, sparsely pubescent along midvein on abaxial surface; petioles 4.3–13.2 cm long, 0.9–1.5 mm in diam., green or red, sparsely strigillose or subglabrous; middle leaf blades 5-angled ovate, orbicular ovate or broadly ovate, 8.6–13.6 cm long, 8.1–13.1 cm wide.

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**Table 2. Comparison of the key morphological characters of the *Boehmeria spicata* complex.**

| Character                  | B. gracilis | B. paraspicata | B. silvestrii | B. spicata |
|----------------------------|-------------|----------------|---------------|------------|
| Plant, habit               | Subshrub    | Subshrub       | Subshrub      | Small shrub|
| Stem, no. of branches      | A few       | A few          | A few         | Many       |
| Stipule, shape             | Lanceolate  | Lanceolate     | Narrowly lanceolate | Narrowly lanceolate |
| Middle leaf blade          |             |                |               |            |
| Shape                      | Elliptic, broadly elliptic, ovate or broadly depressed ovate | Ovate to broadly ovate | 5-angled ovate, orbicular ovate or broadly ovate | Rhombic to rhombic ovate |
| Length (cm)                | 3.8 (10.4) 13.7 | 9.0 (11.7) 19.1 | 8.6 (11.0) 13.6 | 5.7 (7.5) 10.5 |
| Width (cm)                 | 3.3 (7.4) 10.6 | 7.4 (9.5) 16.2 | 8.1 (9.7) 13.1 | 3.5 (4.5) 6.8 |
| Base                       | Cuneate, broadly cuneate or subtruncate | Broadly cuneate | Broadly cuneate or subtruncate | Cuneate or broadly cuneate |
| Margin                     | Serrulate-dentate | Serrate-dentate | Serrate-dentate | Serrate-dentate |
| No. of teeth on each side  | 7 (12) 15 | 6 (10) 14 | 7 (9) 11 | 4 (7) 9 |
| Size of teeth              | Subequal    | Unequal        | Unequal       | Unequal    |
| Lobed of apex              | Unlobed     | Unlobed        | 3- or 5-lobed | Unlobed    |
| Apex                       | Short caudate or cupulate | Caudate or narrowly acute | 3- or 5-caudate | Caudate or narrowly acute |

Bold letters indicate key character.
Fig. 4. Photographs of *Boehmeria paraspicata*. A. Habit. B. Underground structure. C. Base stem. D. Middle stem. E. Adaxial surface of stipule. F. Abaxial surface of stipule. G. Middle leaf. H. Adaxial surface of leaf. I. Abaxial surface of leaf. J. Staminate inflorescence. K. Bud of male flower. L. Male flower. M, N. Pistillate inflorescence at flowering. O. Female flower. P. Pistillate inflorescence at fruiting. Q. Achene. R. Seeds.
base broadly cuneate or subtruncate, margin serrate-dentate, gradually larger distally, teeth 7–11 on each side, narrowly triangular to triangular, 4.6–8.6 mm long, 6.4–10.5 mm wide; apex 3- or 5-caudate, adaxial surface green, sparsely strigillose or subglabrous, densely cystoliths punctiform, midvein convex, abaxial surface yellow green, sparsely strigillose with uncinate hair or subglabrous along veins and veinlets, often thin membranous or chartaceous. **Inflorescences** axillary; staminate inflorescences unbranched or rarely branched in proximal axis, 9.6–15.6 cm long, rachis 0.3–0.7 mm in diam.; pistillate inflorescences unbranched in distal axis, 11.2–22.2 cm long, rachis 0.3–0.5 mm in diam., loosely glomerules at flowering, relatively densely glomerules at fruiting. **Flowers** unisexual; male flowers 4-merous, 3.4–4.3 mm in diam.; pedicels 0.2–1.1 mm long, green or red; perianth lobes cleft near to the middle, convex, elliptic, 0.8–1.0 mm long, 0.8–0.9 mm wide, yellow green or red, strigillose in outside; filaments 4, linear, inﬂexed, 1.3–1.8 mm long, white; anthers basifixed, 0.6–0.9 mm long, 0.8–0.9 mm wide, white; ovaries rudimentary, clavate; female flowers 3.3–4.4 mm long, sessile; perianth tubes obovoid or rhomboid, 1.0–1.2 mm long, 0.7–1.5 mm wide, yellow green or red, strigillose with uncinate hair; necks 2-toothed; styles 1, linear, plumose, 0.9–1.5 mm long, white or red; stigma absent.

**Achenes** rhomboid or obovoid, compressed, 3.1–4.5 mm long, 2.0–2.8 mm wide, base cuneate, irregular strigillose with uncinate hair throughout the surface; petioles opposite, pairs subequal in size; stipules narrowly ovate, 0.8–1.1 mm long, 0.6–0.9 mm wide; wings obovoid or obdeltoioid, 1.3–2.0 mm long, 0.8–1.3 mm wide.

**Chromosome number:** 2n = 42 (Okabe, 1963).

**Phenology:** Flowering June to September, Fruiting September to November.

**Distribution:** Korea (all provinces except Jeju Island), China, Japan.

**Taxonomic note:** *Boehmeria silvestrii* and *B. tricuspis* are often misidentiﬁed and confused with each other because the apex of the leaf has a 3-lobed shape. Therefore, most studies in the literature confused these two with each other. *Boehmeria silvestrii* is clearly distinguished from *B. tricuspis* as it is subshrubs with sparsely strigillose or subglabrous stems, sparsely strigillose leaves, a lobed perianth of the male flower, an unbranched pistillate inflorescence, and an irregular strigillose achene (Figs. 5, 6). It was newly named ‘Cham-geo-buk-kko’-ri’ to avoid confusion with *B. tricuspis*. This taxon has a 3- or 5-lobed leaf apex, unlike other taxa of the *B. spicata* complex (Figs. 3, 5, and Table 2).

**4. Boehmeria spicata** (Thunb.) Thunb., Trans. Linn. Soc. Lond. 2: 330, 1794; *Urtica spicata* Thunb., Syst. Veg., ed. 14, 1850, 1784, *pro part.*; *Duretia spicata* (Thunb.) Nakai, Bull. Natl. Sci. Mus. Tokyo. 31: 42, 1952, nom. illeg.—TYPE: Japan. 1984, C. P Thunberg 22115 (lectotype: UPS, photo!, designated by Yahara, J. Jap. Bot. 59: 130, 1984, see Fig. 1D).

*B. spicata* var. **tenera** Blume, Mus. Bot. 2: 220, 1857; *B. japonica* (L. f) Miq. var. **tenera** (Blume) Friis & Wilmot-Dear, Blumea. 58: 193, 2013.—TYPE: Japan. *Unknown collector s.n., Lugd.-Bat. 908.186-154* (holotype: L).

*B. spicata* var. **akari** Blume, Mus. Bot. 2: 220, 1857.—TYPE: Japan. *Unknown collector s.n., Lugd.-Bat. 908.186-156* (holotype: L).

*B. spicata* var. **microphylla** Nakai ex Satake, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 4: 483, 1936.—TYPE: Japan. Honshu, Prov. Izu, Mt. Amagi, 26 Jun 1931, T. Nakai s.n. (holotype: TI, photo!).

**Korean name:** Jom-ikkae-ip-na-mu (좀개잎나무).

**Habits** small shrub, monoecious or dioecious. **Stems** erect, 0.6–2.5 m tall, 1.2–3.0 mm in diam., many branched from the base, brown, often densely black pubescent, barks peeled off; branches green or red, sparsely strigillose or subglabrous.

**Leaves** opposite, pairs subequal in size; stipules narrowly lanceolate, 3.9–7.0 mm long, 1.1–1.9 mm wide, yellow green, sparsely pubescent along midvein on abaxial surface; petioles 2.2–7.5 cm long, 0.5–1.0 mm in diam., green or red, sparsely strigillose; middle leaf blades rhombic to rhombic ovate, 5.7–10.5 cm long, 3.5–6.8 cm wide, base cuneate or sometimes broadly cuneate, margin serrate-dentate, gradually larger distally, teeth 4–9 on each side, narrowly triangular, 3.8–10.0 mm long, 4.9–10.5 mm wide, apex unlobed, caudate or narrowly acute, adaxial surface green, sparsely strigillose, densely cystoliths punctiform, midvein convex, abaxial surface yellow green, often sparsely strigillose with uncinate hair or subglabrous along veins and veinlets, often chartaceous. **Inflorescences** axillary; staminate inflorescences unbranched or rarely branched in proximal axis, 4.6–15.7 cm long, rachis 0.2–0.7 mm in diam.; pistillate inflorescences unbranched or rarely branched in proximal axis, 4.6–15.7 cm long, rachis 0.2–0.7 mm in diam.; petals 0.3–0.7 mm long, green or red; perianth lobes cleft near to the middle, convex, elliptic, 0.7–0.9 mm long, 1.0–1.1 mm wide, yellow green or red, strigillose in outside; filaments 4, linear, inﬂexed, 1.6–1.9 mm long, white; anthers basifixed, 0.8–1.1 mm long, 0.8–1.0 mm wide, white; ovaries rudimentary, clavate; female flowers 3.4–5.1 mm long, sessile; perianth tubes
Fig. 5. Photographs of *Boehmeria silvestrii*. A. Habit. B. Underground structure. C. Base stem. D. Middle stem. E. Adaxial surface of stipule. F. Abaxial surface of stipule. G. Middle leaf. H. Adaxial surface of leaf. I. Abaxial surface of leaf. J. Staminate inflorescence. K. Bud of male flower. L. Male flower. M, N. Pistillate inflorescence at flowering. O. Female flower. P. Pistillate inflorescence at fruiting. Q. Achene. R. Seeds.
Fig. 6. Comparative photographs of *Boehmeria silvestrii* and *B. tricuspis*. A–G, *B. silvestrii*. H–N, *B. tricuspis*. A, H. Base stem. B, I. Middle stem. C, J. Middle leaf. D, K. Staminate inflorescence. E, L. Male flower. F, M. Pistillate inflorescence. G, N. Achene.
Fig. 7. Photographs of *Boehmeria spicata*. A. Habit. B. Underground structure. C. Base stem. D. Branch. E. Adaxial surface of stipule. F. Abaxial surface of stipule. G. Middle leaf. H. Adaxial surface of leaf. I. Abaxial surface of leaf. J. Staminate inflorescence. K. Bud of male flower. L. Male flower. M, N. Pistillate inflorescence at flowering. O. Female flower. P. Pistillate inflorescence at fruiting. Q. Achene. R. Seeds.
The *Boehmeria spicata* complex in Korea

1. Habits subshrub or small shrub; plants sparsely strigillose or subglabrous; midvein of leaves convex on the adaxial surface; perianth of male flowers parted; pistillate inflorescences usually branched; perianth tube of achenes strigose on apical part  

5. *B. tricuspis* 거북꼬리

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**Conflict of Interest**

The authors declare that there are no conflicts of interest.

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**Appendix 1.** Specimens examined for the *Boehmeria spicata* complex in this study.

1. *Boehmeria gracilis*. CHINA. Guizhou: Jiangkou Xian, Heiwian River, 27 Aug 1986, W. T. Wang & C. J. Chen 557 (TI).

JAPAN. Honshu: Kanagawa Pref., Sagami, 1931, K. Hisauchi s.n. (TI); Nagano Pref., Koshibu-ku, 4 Aug 1966, M. Furuse 44326 (TI); Nagano Pref., Minamisaku-gun, 11 Aug 1978, *Mutura & H. Ohba 5196* (TI); Nagano Pref., Minamisaku-gun, Mt. Sekibutsu, 11 Aug 1978, *Mutura & H. Ohba 5263* (TI); ?, 29 Jul 1939, ? s.n. (TI); ?, 30 Aug 1935, ? s.n. (TI).

KOREA. Changcheongbuk-do: Danyang-gun, Sobaeksan Mt., *KOSYP0000178316* (KB); Danyang-gun, Sobaeksan Mt., Cheongdong Rest Area, 26 Jun 2020, H. J. Jo et al. *HJ200626-002* (ANH); Jecheon-si, Deokdong Valley, 29 Aug 2019, H. J. Jo et al. *HJ190829-005* (ANH); Changcheongbuk-do: Cheonan-si, Gwangdeoksan Mt., 12 Sep 2016, H. J. Jo et al. *HJ160912-001* (ANH); Gangwon-do: Inje-gun, Bangtaesan Mt., 24 Aug 2010, J. S. Kim *NIBRP0000271703* (KB); Gumi-si, Jangju-ri, Jeongeup-si, 7 Jul 1959, T. Uchiyama s.n. (TI); Tochigi Pref., Nikko-shi, Hanaishi-machi, 6 Sep 1983, T. Nakai s.n. (TI).

Japan. Honshu: Kanagawa Pref., Sagami, 1931, K. Hisauchi s.n. (TI); Osaka Pref., Misajubo-cho, Osaka-shi, 1931, T. Uchiyama s.n. (TI).
3. Boechera silvestrél. CHINA. Shaanxi: Qinchuan, 16 Jul 1902, Z. F. Liu 28596 (TI). Shaanxi: Liba country, Zibai Forest Park, 28 Aug 2008, T. Miyazaki 308016 (TI).

4. Boechera vernalis†. CHINA. Hebei: Langfang City, 26 Jun 2020, H. J. Jo et al. HJ200626-001 (ANH); Eumseong-gun, Sureuisan Mt., 21 Jun 2015, H. J. Jo et al. HJ160722-004, 005 (ANH); Yeongju-si, Sobaeksan Mt., Choam Temple, 24 Oct 2018, H. J. Jo et al. HJ160723-004 (ANH).

5. Boechera yamatoana†. CHINA. Kanto: Tokyo, c. 1920, T. Miyazaki 4940 (TI), T. Miyazaki s.n. (TI).
HJ160713-001 (ANH); Yeosu-si, Hwangsaebong Mt., 2 Sep 2019, H. J. Jo et al. HJ190902-004 (ANH); Yeosu-si, Hwangsaebong Mt., 23 Jun 2020, H. J. Jo et al. HJ200623-001 (ANH). Seoul-si: ?, 13 Jun 1981, G. S. Chung SKKA200007191114 (KH). ?, Sep 1911, ? 5967 (TI); ?, 1912, T. Mori s.n. (TI); ?, 22 Sep 1915, T. Nakai 9979 (TI); ?, 3 Aug 1938, T. Nakai 16011 (TI).