Taxonomy of tribe Neillieae (Rosaceae): Neillia

Sang-Hun Oh*

Department of Biology, Daejeon University, Daejeon 34520, Korea
(Received 16 February 2016; Revised 6 March 2016; Accepted 6 March 2016)

ABSTRACT: Neillieae was traditionally recognized as a small tribe in Rosaceae, which consists of Neillia, Stephanandra, and Physocarpus. Recently, Stephanandra was merged into Neillia based on molecular phylogenetic analyses, meaning that Neillieae now contains Neillia and Physocarpus. The genus Neillia is distinguished from Physocarpus by ovate to lanceolate leaves with acuminate to caudate apices, racemose or paniculate inflorescences, and a unicarpellate (rarely bicarpellate) gynoecium. Plants of Neillia are distributed from the Himalayas across China and Korea to Japan in the east, and south to Indonesia. This study provides a taxonomic treatment of Neillia based on a morphological examination of herbarium specimens, including types, and field observations, as the second part of the taxonomic revision of the tribe Neillieae. A summary of the phylogeny of Neillia, keys to the species, nomenclatural reviews, descriptions, distribution maps, and lists of specimens examined are provided. Twelve species with ten varieties are recognized in Neillia. A lectotype was designated here for the following species: N. sinensis f. glanduligera and N. thyrsiflora.

Keywords: Neillieae, Neillia, revision

적 요: 나도국수나무족(Neillieae)은 전통적으로 나도국수나무속(Neillia), 국수나무속(Stephanandra), 산국수나무속(Physocarpus)의 3속으로 구성된 장미과의 분류군으로 인식되어 왔다. 그러나, 국수나무속은 최근의 분자계통학적 연구에 근거하여 나도국수나무속에 포함되어, 나도국수나무속은 나도국수나무속과 산국수나무속의 2속으로 구성된 족으로 인식된다. 나도국수나무속은 난형 내지 피침형의 줄기, 절경두 내지 모리형의 열선, 총상 또는 원추과의 식물은 특징에 의해 산국수나무속과 터졌어 구분된다. 본 속의 식물은 히말라야에서 중국 및 한국을 거쳐 동쪽으로 일본, 남쪽으로 인도네시아에 걸쳐 분포한다. 본 연구에서는 나도국수나무속의 종중지적 연구의 일환으로 나도국수나무속의 분류를 재시하였다. 기존표본을 포함한 표본 조사 및 야외 조사를 바탕으로 형태학적 분석 결과와 현재까지 밝혀진 분자계통학적 연구 결과를 통합하여 각 종에 대한 검색표, 모든 학명에 대한 자세한 명명법적인 검증 및 처리를 포함하여 나도국수나무속 및 각 종에 대한 기재, 분포도 및 조사한 표본의 목록을 제시하였다. 본 연구에서는 나도국수나무속에 12종을 인식하였으며, 이 중 3종에 중 10종을 인식하였다. 또한, N. sinensis f. glanduligera 및 N. thyrsiflora의 학명에 대한 신정기준표본을 지정하였다.

주요어: 나도국수나무속, 나도국수나무, 종중지

*Author for correspondence: soh42@dju.kr
tribe Neillieae (Oh, 2015), the nomenclatural history of tribe Neillieae and the taxonomic treatment of Physocarpus were provided. This study provides a taxonomic treatment of Neillia, including Stephanandra.

In the traditional sense, Neillia was recognized as having nine species of deciduous shrubs that are distributed from the Himalayas across China to Korea in the east, and south to Indonesia (Vidal, 1963; Schulze-Menz, 1964; Cullen, 1971; Kalkman, 1993). Stephanandra was considered as a small genus consisting of three species indigenous to China, Taiwan, Korea, and Japan (Ohwi, 1965; Yu and Ku, 1974; Lee, 1980). Morphological characters of the fruits and seeds, such as the degree of dehiscence of the follicles, the orientation of the style, the number of seeds per follicle, and the texture of the seed coat, have been used to distinguish Neillia from Stephanandra (Vidal, 1963; Cullen, 1971). Oh (2002, 2006), however, determined that these characters do not clearly separate the two genera. The hypanthium shape and capitate-glandular trichomes on the surface of the hypanthium are useful to differentiate the two genera (Oh, 2002, 2006). Members of Neillia in the traditional sense have campanulate to cylindrical hypanthia with capitate-glandular trichomes developed after anthesis, while species of Stephanandra have cupulate hypanthia without capitate-glandular trichomes.

Phylogenetic analyses using DNA sequences of chloroplast and nuclear genes have suggested that Neillia and Stephanandra together form a strongly supported monophyletic group (Oh and Potter, 2003, 2005; Oh, 2013). However, none of the molecular data support the reciprocal monophyly of Neillia and Stephanandra. Specifically, DNA sequence data of the chloroplast trnL-trnF, trnD-trnT, matK-trnK, and psbA-trnK regions and the second intron of LEAFY congruently support the contention that Stephanandra can be distinguished from Neillia by ovate lanceolate leaves with acuminate to caudate apices, racemose or paniculate inflorescences, and a unicarpellate (rarely bicarpellate) gynoecium. In a series of two papers, a comprehensive taxonomy of tribe Neillieae reflecting most recent morphological and molecular analysis of the group (Oh and Potter, 2003, 2005; Oh, 2004, 2006, 2015; Oh et al., 2010) is provided. As the second part of the taxonomic revision of tribe Neillieae, this paper provides a morphological description of Neillia along with a detailed synonymy and a key to the species.

Materials and Methods

Approximately 2,000 herbarium specimens of Neillia were examined. Specimens were borrowed from major herbaria, including A, BM, E, GH, K, KPM, L, MO, NY, P, PE, and UC (Thiers, 2016). Specimens at DAV, KB, and KUN, and those collected by the author were also examined. The data...
presented here, including plant measurements and distributions, were obtained mainly from herbarium specimens. Where more than 100 herbarium specimens were studied for a taxon, a subset of the total specimens examined is cited.

**Taxonomic Treatment**

**Neilliae** Maxim., Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 216. 1879.–TYPE: Neillia D. Don

Description of Neilliae and taxonomic treatment of *Physocarpus* can be found in Oh (2015).

**Key to the genera of tribe Neilliae**

1. Leaves covered with stellate trichomes of various density; inflorescences corymbs; follicles dehiscent along both ventral and dorsal sutures —— Physocarpus ——

2. Stamens 10; sepals obtuse to rounded at the apex. ——

3. Leaves deeply 3–5-lobed; the middle lobes with 3–5 pairs of secondary veins —— 4. *N. incisa* ——

4. Leaves shallower 3-lobed; the middle lobes with > 5 pairs of secondary veins —— 3. *N. hanceana* ——

5. Hypanthia campanulate to cylindrical, with capitulate-glandular trichomes on the surface at the fruiting stage. ——

6. Hypanthia cylindric or cylindric-campanulate. ——

7. Inflorescences with 10–20 flowers; pedicels 2.2–7 mm long; hypanthia 6–9 mm long —— 7. *N. incisa* ——

8. Inflorescences with 20 flowers; pedicels 3–5 cm long; hypanthia 4–5.5 mm long —— 8. *N. sinensis* ——

9. Petals white; carpel 1, glabrous —— 9. *N. rubiflora* ——

10. Inflorescence rachis with stellate —— 10. *N. uekii* ——

11. Petals pale pink; carpels 1–5, densely pubescent throughout the surface —— 11. *N. affinis* ——

12. Petals white; carpel 1, glabrous —— 12. *N. rubiflora* ——

Shrubs to 2 m high, with erect, spreading, or scandent branches. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate to lanceolate, 3–6 (–10) cm long, 2.1–5.5 (–10) cm wide, shallowly 3-lobed, the apex acute to caudate, the base cordate to rounded, the margin doubly serrate, the upper and lower surfaces glabrous to moderately pubescent; petioles 0.8–2 cm long; stipules ovate to lanceolate, 5–10 mm long, serrate or entire, deciduous after anthesis. Inflorescences racemes or panicles of racemes, if panicles, 4–5 branched, 3–6 cm long, densely pubescent, more than 10-flowered; flowers fascicled at the apex of the inflorescence, or more or less evenly distributed along the inflorescence rachis; bracts lanceolate, 5–6 mm long; pedicels 1–4 mm long. Hypanthyum globular-campanulate to orbicular, pale pink; stamens 15; petals developing after anthesis; sepals triangular, 2.5–7 mm long, acuminate at the apex, pubescent on both surfaces; petals orbicular, pale pink; stamens 15–25, the longest filaments ca. 1.8 mm long; carpels 1–5, if more than 1, free or weakly connate at the base, densely pubescent throughout the surface; ovules 6–8 per carpel. Follicles ca. 4 mm long, with more or less erect beaks; seeds 6 per follicle, ca. 2 mm long, dark brown.

Neillia affinis is similar to N. rubiflora in having densely pubescent globular-campanulate hypanthyria. Both species can have racemes and panicles, although racemes are more common in N. affinis and panicles are common in N. rubiflora. Neillia affinis can be distinguished from N. rubiflora by its densely pubescent carpels. Four varieties may be distinguished as follows:

1. Carpels 3–5, free var. polygyna
1a. Neillia affinis var. affinis

Shrubs to 2 m high, with erect, spreading, or scandent branches. Blades ovate, 3–6 (–10) cm long, 2.8–5.5 (–10) cm wide, the apex acute to acuminate, the base cordate to rounded, the upper and lower surfaces glabrous to sparsely pubescent. Inflorescences racemes or panicles of racemes, if panicles, 4–5 branched, densely pubescent, 10–many-flowered; flowers more or less evenly distributed along the inflorescence rachis. Carpels 1–2, if 2, weakly connate at least at the base.

Distribution. China in Sichuan and Yunnan (Fig. 2); recorded by Cullen (1971) from Myanmar; 1,400–3,200 m.

Plants of this variety often have two carpels that are occasionally connate at the base as in Physocarpus.

Specimens examined. CHINA. Sichuan: without specific locality, elev. 8,000 ft., Jul 1904, Wilson 3560 (A, P); Opien Hsien, 14 Jul 1930, Yang 4694 (A, NY); Nanchuan Hsien, elev. 8,000–9,000 ft., 25 May 1928, Fang 935 (A); Nanchuan-Xian, elev. 8,000–9,000 ft., 25 May 1928, Feng 935 (A); Hsian-hsia-lang, elev. 2,000 m, 21 May 1922, Smith 1865 (A); Ma-ping Hsien, elev. 2,400 m, 27 May 1931, Wang 22992 (A); cliffs of Mt. Wu-shan, elev. 8,000 ft., Jul 1903, Wilson 3559 (A–2 sheets); Mt. Wu-shan, Jun and Sep 1908, Wilson 916a (A–3 sheets); Juei-shie Hsien, elev. 2,500 m, 31 May 1932, Yu 941 (A); Yunnan: without specific locality and date, Forrest 7584 (A); inter fluxios Landsang-djiang (Mekong) et Lu-djiang (Salween), ca. 28°N, in valle a jugo Si-la, a vicum Tsekuo descendente, elev. 2,300–2,500 m, 15 Jun 1916, Handel-Mazzetti 8884 (A); Fuchuan range, W of the Mekong-Salween divide and W of Wei-hsi, elev. 10,500 ft., Aug-Sep 1932, Rock 23275 (A, NY); Fuchuan range, W of the Mekong-Salween divide and W of Wei-hsi, elev. 10,500 ft., May-Jun 1932, Rock 22729 (A, NY); Yi-liang Hsien, elev. 1,400 m, 27 May 1932, Tsai 52055 (A); Yong-shan Hsien,

Fig. 2. The distributions of N. affinis var. affinis and var. longisepala.
Shrubs to 2 m high, with erect or spreading branches. Blades ovate to lanceolate, 3–6 cm long, 3–5.5 cm wide, the apex acuminate to caudate, the base cordate to rounded, the upper and lower surfaces glabrous to sparsely pubescent. Inflorescences racemes, densely pubescent, more than 10-flowered; flowers more or less evenly distributed along the inflorescence rachis. Carpels 1.

**Distribution.** China in Sichuan and Yunnan (Fig. 3); 2,000–2,300 m.

This variety can be distinguished from the other varieties by having flowers fascicled at the apex of the inflorescence and by having fewer flowers per inflorescence.

Typification of *Neillia affinis* var. *pauciflora* is complicated. Rehder (1913) cited two specimens in the original description of *N. pauciflora*, in which he wrote “Nos. 10231a, type, 10231. Therefore, it is unclear whether 10231 or 10231a was cited as the type. I examined original specimens from A, K, and NY and found that one specimen at NY bears both numbers on one specimen with one plant, while others have one or the others of the two numbers. All of the specimens cited for the taxon were collected in the same place and on the same day by the same person, and perfectly match. Vidal (1963) cited *Henry 10231a* at K as the type, but Henry’s specimen at K bears number 10231. Here, I correct the collection number of the lectotype designated by Vidal at K as number 10231.

**Specimens examined.** CHINA. Sichuan: Mt. Omei, Jun 1904, Wilson 4886 (A).


Shrubs to 1.5 m high, with erect or spreading branches. Blades ovate, 3–5 cm long, 2.1–4 cm wide, the apex acute to acuminate, the base cordate, the upper and lower surfaces moderately pubescent; stipules ovate, entire. Inflorescences racemes, 2–3 cm long, densely pubescent, 5–10-flowered; flowers fascicled at the apex of the inflorescence; bracts lanceolate, 5–6 mm long; pedicels 1.5–2 mm long. Carpels 1–2.

**Distribution.** China in Sichuan and Yunnan (Fig. 3); 2,000–2,300 m.


Shrubs to 2 m high, with erect or spreading branches. Blades ovate, 3–6 (–10) cm long, 2.8–5.5 (–10) cm wide, the apex acute to acuminate, the base cordate to rounded, the upper and lower surfaces glabrous to sparsely pubescent. Inflorescences racemes, densely pubescent, more than 10-flowered; flowers more or less evenly distributed along the inflorescence rachis. Carpels 3–5, free.

**Distribution.** China in Yunnan and Xizang (Tibet) (Fig. 3); 4,000 m.

**Specimens examined.** CHINA. Yunnan: on the Kari pass, 28°N, elev. 4,000 m, Jun 1917, *Forrest 14002* (A). Xizang (Tibet): Sarong on Doker La, Mekong-Salween divide, 28°20’N, without date, *Forrest 14342* (A).

---

Fig. 3. The distributions of *Neillia affinis* var. *pauciflora* and var. *polygyna.*

Shrubs to 0.5 m high, with decumbent branches. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate to broadly ovate, 2.5–3.5 cm long, 2–3 cm wide, shallowly 3-lobed, the apex acute to acuminate, the base cordate, the upper and lower surfaces sparsely pubescent; petioles 1–1.6 cm long; stipules ovate, 4–6 mm long, serrate or entire, persistent or deciduous after anthesis. Inflorescences racemes, 1–1.8 cm long, glabrous, 3–8-flowered; flowers fasciated at the apex of the inflorescence; bracts lanceolate, 3–5.5 mm long; pedicels 0.8–1 mm long. Hypanthium campanulate, 3.2–3.5 mm long, 2.8–3.2 mm wide at the widest point, moderately pubescent, capitulate-glandular trichomes developing after anthesis; sepals ovate, 2–3 mm long, apiculate at the apex, pubescent on both surfaces; petals orbicular, white or pale pink; stamens 15, the longest filaments ca. 1.5 mm long; carpel 1, densely pubescent upper half or at the apex; ovules 2 per carpel. Follicles 4.5 mm long, with more or less erect beaks; seeds 2 per follicle, ca. 2.4 mm long, dark brown.

Distribution. China Sichuan and Yunnan (Fig. 4); alpine meadows, mixed coniferous forests; locally common; 2,800–3,100 m.

Neillia gracilis, which occurs in Sichuan and Yunnan Provinces of China, is morphologically unique in Neillia. Compared to other species in the genus, which are many-branched shrubs reaching up to 3 m high, N. gracilis can be easily distinguished by its small size, reaching only 50 cm in height. Plants of this species are suffrutescent and rhizomatous, having only a few decumbent branches with several leaves on each branch. Cullen (1971) considered N. gracilis to be closely related to N. wekii based on the number of ovules, both having two. However, N. gracilis is similar to N. affinis in having a broadly ovate blade with three shallow lobes and flowers clustered at the apex of inflorescence.

Specimens examined. CHINA. Sichuan: inter Hunka et Woholo, elev. 3,000 m, 13 Jun 1914, Schneider 1506 (A, GH); Yunnan: NW Likiang, Ah-s-chi, in mixed forests, 25 Jun 1939, Ching 20891 (A); Likiang snow range, in mixed forests, 28 Jun 1939, Ching 30281 (A); Chungtien valley, elev. 3,500 m, 9 Aug 1939, Feng 1936 (A); Lichiang Range, elev. 10,000–10,500 ft, 27°12’ N, May 1906, Forrest 2244 (A); Mts S of Likiang, near Hochin and Chiuno, 25–28 May 1922, Rock 4079 (A); Yangtze watershed, prefectural district of Li-kiang, eastern slopes of Likiang snow range, Jun 1922, Rock 4422 (A); Likiang range, 31 Jun 1914, Schneider 2071 (A); N end of Cangshan, Wutaishan, above Huadianba, elev. 3,300 m, 20 May 1981, Sino-British Expedition to Cangshan 0934 (A); Li-kiang Hsien, elev. 2,800 m, Jul 1935, Wang 70883 (A).


Shrubs to 3 m high, with erect or spreading branches. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate, 4.3–9 cm long, 2.7–5.5 cm wide, shallowly 3-lobed, the apex caudate to acuminate, the base attenuate, cordate, or truncate; the middle lobes with 6–7 pairs of secondary veins, the upper surface glabrous or sparsely pubescent, the lower surface sparsely pubescent; petioles 3–8 mm long; stipules lanceolate, 7–9 mm long, entire, persistent or deciduous after anthesis. Inflorescences panicles of racemes, 3–8 branched, 6–9 cm long, glabrous; bracts oblanceolate, 2.5–3 mm long; pedicels 4–5 mm long. Hypanthium cupulate, 1 mm long, 2–2.2 mm wide at the rim, glabrous, capitulate-glandular trichomes absent; sepals triangular to ovate, 1.3–2 mm long, obtuse to rounded at the apex, ciliate at the margin; petals obovate, white; stamens 10, the longest filaments ca. 1 mm long; carpel 1, densely pubescent throughout the surface; ovules 2

Fig. 4. The distributions of N. gracilis and N. sparsiflora.
per carpel. Follicles 2–2.4 mm long, with spreading beaks; seeds 1 (rarely 2) per follicle, 1.6–1.9 mm long, dark brown.

**Distribution.** China in Anhui, Guangdong, Guizhou, Hunan, Jiangxi, and Zhejiang (Fig. 5); locally common; 400–900 m.

The basionym of *N. hanceana* is *Physocarpus hanceanus*, a replaced name for *Stephanandra chinensis* (Kuntze, 1891). When *Stephanandra chinensis* is transferred to the genus *Neillia*, the new combination of *N. chinensis* cannot be used because of the existence of *N. sinensis* (Oliver, 1886). The epithets, *chinensis* and *sinensis*, are considered as confusingly similar and are treated as homonyms when they are based on different types (ICN Article 53.3; McNeill., 2012). When Kuntze (1891) merged *Neillia* and *Stephanandra* into *Physocarpus*, he simultaneously transferred both *Stephanandra chinensis* and *Neillia sinensis* Oliver to the genus *Physocarpus*. Because of a new combination *P. sinensis* (Oliver) Kuntze, *Physocarpus hanceanus* Kuntze is considered a replaced name for *Stephanandra chinensis* (Oh, 2006).

The leaves of *Neillia hanceana* are very similar to those of *N. sinensis*, but the two species can be easily distinguished by floral characters. *Neillia hanceana* has cupulate hypanthia and panicles with white flowers, whereas *N. sinensis* has cylindric hypanthia and racemes with pinkish flowers.

**Specimens examined.** CHINA. Anhui: Yue Xi Xian, Yauluoping, elev. 1,100 m, 14 Aug 1997, Xie *et al.* 97034 (A); Mt. Huang-shan, Wenhuan Hot Spring, elev. 700 m, 10 May 1979, Deng & Yao 79061 (A, NY); Guangdong: Renhwa District, Mt. Danxian-shan, 21–30 May 1936, Tsang 26432 (A); Guizhou: Jiangkou Xian, Heiwan River on the SE side of the Fanjing-shan mountain range in the vicinity of the Ecological Station of the Guizhou Academy of Sciences, elev. 560 m, 24 Aug 1986, Sino-American Guizhou Botanical Expedition 350 (A); Hubei: Mt. Jigong-shan, border of the provinces of Hubei and Hunan, on the divide between the Yangtze and Hwaiho Rivers, elev. 1,500–2,500 ft., 13 Jun 1917, Bailey *s.n.* (A); Hunnan: Hnlu Xining Xian, in valley, elev. 950 m, 26'4N, 110'8'E, 12 May 1996, Luo 1355 (A); Jiangxi: Lu-shan Mts., 2 Jul 1983, Hu 1570 (A, UC); Mt. Huang-shan, Wenquan Hot Spring, elev. 700 m, 10 Jun 1927, Hu 1570 (A, UC); Mts. Tien-mu-shan, 23 Jul 1930, Liou 92 (NY).


Korean name: Guk-su-na-mu (국수나무)


Shrubs to 2.5 m high, with erect or spreading branches. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate to deltoid, 2–5.4 cm long, 1.5–3.8 cm wide, deeply 3–5-lobed, the apex ciliate to acuminate, the base truncate to cordate; the upper surface glabrescent; the middle lobes with 3–5 pairs of secondary veins; petioles 4–8 mm long; stipules lanceolate to linear, 5–7 mm long, entire, deciduous after anthesis. Inflorescences panicles of racemes, 2–6 branched, 2–3 cm long, sparsely pubescent or glabrous; bracts ob lanceolate, 0.9–1.6 mm long; pedicels 2.5–3.5 mm long. Hypanthium cupulate, 1–1.2 mm long, 2–2.5 mm wide at the rim, glabrous, capitate-glandular trichomes absent; sepals triangular to ovate, 1.1–1.3 mm long, obtuse to rounded at the apex, ciliate at the margin at the margin; petals obovate, white;
stamens 10, the longest filaments ca. 1.2 mm long; carpel 1, densely pubescent throughout the surface; ovules 2 per carpel. Follicles 1.8–3 mm long, with spreading beaks; seeds 1, rarely 2 per follicle, ca. 2 mm long, dark brown. Chromosome number: $2n = 18$ (Iwatusubu and Narushashi, 1993).

**Distribution.** China in Shandong, Taiwan, Korea, and Japan (Fig. 5); mixed deciduous forests; common; 10–1,600 m.

**Representative specimens examined.** CHINA. Jiangsu: Lianyun District, Lianyungang city, Lihu (Willow River site), 34°41'N, 119°25'E, 8 Jun 1987, *Sino-American Tintault Botanical Expedition Team* 45003 (A); Shandong: 100 li from Qingdao, Mt. Lao-shan, 1 Jul 1930, Chiao 2644 (A, NY–2 sheets, UC); Taisinggong prope Qingdao, 6 Jun 1936, Licent 13363 (A).


**Distribution.** CHINA. Jiangsu: Taoda 3721 (A); Fukushima Pref., Iwaki-shi, Mt Yada-jin-yama, 31 Jul 1983, Ohashi et al. 9459 (A); Gunma Pref., Hoshi spa, Ohashi et al. 11061 (A, MO); Honshu: Chiba Pref., Mt Kiyosumi, Tokyo University forest, Kiyosumi, 25 May 1983, Ohashi et al. 9459 (A); Gumma Pref., Hoshi spa, Ohashi et al. 11061 (A, MO); Gunma Pref., Taisan-gong prope Qingdao, 6 Aug 1936, Ono & Kobayashi 37 (A).

**Distribution.** CHINA. Jiangsu: Taoda 3721 (A); Fukushima Pref., Iwaki-shi, Mt Yada-jin-yama, 31 Jul 1983, Ohashi et al. 9459 (A); Gunma Pref., Hoshi spa, Ohashi et al. 11061 (A, MO); Gunma Pref., Taisan-gong prope Qingdao, 6 Aug 1936, Ono & Kobayashi 37 (A).

Shrubs to 1–2 m high, with erect or spreading branches. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate, 4–9 (–11) cm long, 3–5 (–8) cm wide, shallowly 3-lobed, the apex acuminate to caudate, the base cordate, the upper and lower surfaces sparsely pubescent; petioles 1.2–1.5 cm long; stipules lanceolate or linear, 7–9 mm long, entire, deciduous after anthesis or early deciduous. Inflorescences racemes or panicles of racemes (if panicles, 4–8 branched), 3.5–7 cm long, densely pubescent; bracts lanceolate, 4–5 mm long; pedicels 1–1.5 mm long. Hypanthium campanulate, 3–3.5 mm long, 4–5 mm wide at the widest point, densely pubescent, capitate-glandular trichomes developing after anthesis; sepals triangular, 2.5–4.2 mm long, apiculate at the apex, pubescent on both surfaces; petals orbicular, white; stamens 25, the longest filaments ca. 2 mm long; carpel 1, glabrous; ovules 8 per carpel. Follicles 7–8 mm long, with more or less erect beaks; seeds 8 per follicle, 1.6–1.8 mm long, yellowish brown.

**Distribution.** Bhutan, Nepal, and China in Yunnan (Fig. 6); slopes of forests, near waterfalls; 2,000–3,000 m.

*Neillia rubiflora* is similar to *Neillia affinis* and *Neillia thyrsiflora* but can be distinguished from the former species by having a single carpel per flower, which is glabrous or pubescent only at the apex and from the latter species by lacking multiple superposed buds in the leaf axils on flowering branches. Unlike other species of *Neillia*, seeds of *Neillia rubiflora* are yellowish brown. However, since there are only a few collections with fruiting branches, it is not clear whether the seed color can be used to delimit the species.

**Specimens examined.** BHUTAN. Forested slopes below Namning, NW of Mongar, 27°19′N, 91°02′E, elev. 2,300 m, 5 Jul 1979, *Grierson & Long 2492* (A); near large waterfall above Namning, NW of Mongar, 27°20′N 91°02′E, elev. 2,600 m, 15 Jun 1979, *Grierson & Long 1936* (A).

INDIA. Sikkim, without date, *Hook. f. s.n.* (GH); Sirhoi, without date, *Kingdon-Ward 17665* (NY); Sikkim, without date, *Schneider s.n.* (A).


Shrubs to 1.5 m high, with erect or spreading branches. Leaves on the flowering branches with multiple, superposed buds in their axils; blades ovate, 6–7.5 cm long, 2.5–4.5 cm wide, shallowly 3-lobed, the apex acuminate to caudate, the base truncate or cordate, the upper and lower surfaces sparsely pubescent; petioles 5–8 mm long; stipules ovate, 6–7 mm long, serrate, deciduous after anthesis. Inflorescences panicles of racemes, 2–3 branched, ca. 4 cm long, densely pubescent; bracts ovate or lanceolate, 3.8–4.8 mm long; pedicels 2.5–5 mm long. Hypanthium campanulate, ca. 3.5 mm long, 2–2.2 mm wide at the widest point, densely pubescent, capitately-glandular trichomes developing after anthesis; sepals triangular, 1.6–2 mm long, acuminate to caudate at the apex, densely pubescent on both surfaces; petals orbicular, white; stamens ca. 20, the longest filaments ca. 1.2 mm long; carpel 1, densely pubescent throughout the surface; ovules 3–4 per carpel.

**Distribution.** Fugong (Shang-pa is the old name), which is located in northwestern Yunnan in China (Fig. 6); 2,000 m.

*Neillia serratisepala* is only known from the holotype.
specimen. This species is similar to *Neillia thrysiflora* in having multiple, superposed buds in leaf axils on flowering branches, but differs in the number of ovules and the longer pedicels of the loose panicles. Cullen (1971) suggested that this species could be considered as a variety of *Neillia thrysiflora*. However, because only the type specimen is available for this species, I treat it as a species (Li, 1944; Vidal, 1963; Cullen, 1971).

**7. Neillia sinensis** Oliv. in Hook. f., Icon Pl. 16: t. 1540, 1886; *Physocarpus* sinensis (Oliv.) Kuntze, Revis. Gen. Pl. 1: 218, 1891; *Opulaster sinensis* (Oliv.) Kuntze, Revis. Gen. Pl. 2: 949, 1891.—TYPE: China. Hupeh: District Patung Ichang, *Henry 641* & *605* (holotype: K!). The type consists of two specimens mounted on one sheet of paper, both of which are labeled *Henry 641* & *605*. According to Vidal (1963), there is another herbarium collection at K of *Henry 641*, and it is the type of *Lysimachia auriculata*. Thus, *Henry 641* & *605* is considered as the holotype of *Neillia sinensis* consisting of two branches.

Shrubs to 1.5–2 m high, with erect or spreading branches; branches glabrous or densely pubescent. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate to lanceolate, 4–12 cm long, 2–7 cm wide, shallowly to more or less deeply 3-lobed, the apex acuminate to caudate, the base cordate to rounded, the upper and lower surfaces glabrous to sparsely pubescent; petioles 0.5–1 cm long; stipules elliptic or ovate to lanceolate, 3–7 mm long, serrate or entire, deciduous after anthesis. Inflorescences racemes, 3.5–7 cm long, glabrous or densely pubescent, 10–20-flowered; flowers more or less evenly distributed along the inflorescence rachis; bracts lanceolate, 8–10 mm long; pedicels 2.2–7 mm long. Hypanthium cylindric, 6–9 mm long, 3–4.5 mm wide at the widest point, glabrous to sparsely pubescent with simple unicellular or stellate trichomes at the base, capitule-glandular trichomes developing after anthesis; sepals triangular, 2.5–6 mm long, acuminate to caudate at the apex, pubescent on adaxial surface; petals orbicular or obovate, white or pale pink; stamens 15–25, the longest filaments ca. 2 mm long; carpels 1 rarely 2, if 2, free, pubescent only at the apex or glabrous; ovules 4–6 per carpel. Follicles 9–10 mm long, with more or less erect beaks; seeds 3–4 per follicle, 2–2.5 mm long, dark brown. Chromosome number: *n* = 9 (Ratter and Milne, 1973).

*Neillia sinensis* is widely distributed in China and is morphologically very similar to *Neillia thibetica* in having racemes of pink flowers with cylindric hypanthia. Cullen (1971) investigated the morphological variation of the two species and concluded that they were separable by a combination of characters. According to Cullen (1971), *Neillia sinensis* is distinguished from *Neillia thibetica* by having glabrous hypanthia, longer hypanthia and pedicels, and fewer flowers per inflorescence. The number of ovules, which was an important character in Vidal’s treatment (1964), was not useful in distinguishing the two species (Cullen, 1971). *Neillia sinensis* is variable in leaf size, shape, and lobation. Three varieties can be recognized as follows:

1. Flowering branches and the lower surface of leaves glabrous to sparsely pubescent .......................... var. *sinensis*
2. Sepals 5.5–6 mm long; hypanthia sparsely stellate-pubescent at the base .............................. var. *villosa*
3. Sepals 2.5–4.5 mm long; hypanthia glabrous or sparsely pubescent with simple unicellular trichomes at the base .............................. var. *hypomalaca*

**7a. Neillia sinensis** var. *sinensis*


Branches glabrous. Blades ovate to lanceolate, 5–11 cm long, 3–6 cm wide, shallowly 3-lobed, the apex acuminate to
caudate, the base cordate to rounded, the upper and lower surfaces glabrous to sparsely pubescent; stipules ovate to lanceolate, 3–7 mm long, serrate. Inflorescences glabrous to sparsely pubescent. Hypanthium 6–9 mm long, 3–4.5 mm wide at the widest point, glabrous to sparsely pubescent with simple unicellular trichomes at the base; sepals triangular, 2.5–4.5 mm long; ovules 4–5 per carpel.

**Distribution.** From Yunnan and Guangxi northward to Shaanxi, Henan, and Gansu in China (Fig. 7); river banks, wooded slopes; 400–1,800 m.

**Neillia sinensis** var. **caudata** has been characterized as having caudate to acuminate lobe apices on shallowly 3-lobed leaves. In his original description for the taxon, Rehder (1913) stated that the leaves of var. **caudata** resemble *N. thyrsiflora*. The holotype specimen (Henry 9669) deposited at A matches the original description. However, an isotype housed at MO has nearly unlobed ovate to lanceolate leaves with caudate apices, although the inflorescence characters are identical. In some specimens that can be ascribed to var. **caudata**, both types of leaves are often found in the same branch. Thus I do not consider var. **caudata** to be a separate taxon.

There is another Henry collection numbered 9669 at NY with his handwriting on the original label. This specimen, however, is clearly *N. thyrsiflora*. A number of collections of *Neillia thyrsiflora* and *N. affinis* var. **pauciflora** were also reported from the type locality of var. **pauciflora** (East Mountain in Mengtze, Yunnan). I visited East Mountain, which is also the type locality of *N. affinis* var. **pauciflora**, in 2000 to locate the populations of *Neillia* and found that the whole mountain area was deforested by gravel mining.

*N. ribesioides* was recognized based on slightly shorter hypanthia and pedicels than those of *N. sinensis* var. **sinensis** (Rehder, 1913; Cullen, 1971). The sizes of hypanthia and pedicels of the lectotype of *Neillia ribesioides*, however, are not different from those of the holotype of *Neillia sinensis*, and there is a considerable variation in the length of hypanthia and pedicels within an individual in many specimens. Therefore, I do not treat *N. ribesioides* as a separate taxon.

Hsien, elev. 4,000–6,000 ft., Jun & Sep 1097, Wilson 189 (A–3 sheets). Hunan: Changning Hsien, Mt. Yang-shan, elev. 740 m, 13 Jul 1935, Fan & Li 242 (A); Mt. Yun-shan prope urbem Wukang, elev. 600–1,300 m, 6 Jun 1918, Handel-Mazzetti 765 (A). Jiangxi: Mt. Yuyuang-shan, Hsien-shui, 10 Nov 1947, Hsiung 6523 (A). Shaanxi: Tu-kia-po, 4 Jun 1897, Giraldi s.n. (A); Monte Chore-pei-san, 20 Jul 1897, Giraldi s.n. (A); Lungchow, Kuan-shan, elev. 2,000 m, 3 Jul 1922, Rock 9171 (A); Taipei-shan, in 1910, Handel-Mazzetti 765 (A). Sichuan: Wuxi Xian, Long Dong Wan, 28 May 1996, Chen et al. 960355 (MO); Nanchuan Hsien, 27 May 1928, Fang 1057 (A, NY); Cheng-kou Hsien, 13 May 1932, Fang 10315 (A, NY). Yunnan: Wei Hsi, 4 May 1933, McLaren 27D (A); Yong-shan Hsien, elev. 2,100 m, 4 Jun 1932, Tsai 50992 (A); Chen-hsiung Hsien, elev. 1,850 m, 3 Jul 1932, Tsai 52706 (A); Wei-si Hsien, Yeh-Chih, elev. 2,400 m, July 1935, Wang 67945 (A).


Branches densely pubescent. Blades ovate, 4–6.7 cm long, 2–3.5 cm wide, shallowly to more or less deeply 3-lobed, the apex acuminato to caudate, the base cordato to rounded, the upper surface moderately pubescent, the lower surface densely pubescent; stipules elliptic or ovate to lanceolate, 3–5 mm long, serrate. Inflorescences densely pubescent. Hypanthium 6–9 mm long, 3–4.5 mm wide at the widest point, glabrous to sparsely pubescent with simple unicellular trichomes at the base; sepals triangular, 2.5–4.5 mm long.

**Distribution.** China in Yunnan (Fig. 8); 1,700–3,300 m.

**Specimens examined.** CHINA. Yunnan: NW Likiang, Lutien, 3 Jun 1939, Ching 20483 (A); Liu-ti-ping, 27°12’N, elev. 3,300 m, Jun 1917, Forrest 13883 (A); Du-long, halliers des mont, elev. 2,990 m, without date, Maire 529 (A); Tong Cheh-ouan, collines, elev. 2,990 m, without date, Maire 429 (A); Ziyang, above Yangbi, elev. 2,450 m, 10 May 1981, Sino-British Expedition to Cangshan 456 (A); Chao-tung Hsien, elev. 1,700 m, 19 May 1932, Tsai 50992 (A); Kang-pu, Weihsi Hsien, elev. 1,932 m, Jul 1935, Wang 64159 (A).


Branches densely pubescent. Blades lanceolate, 8–12 cm long, 2.8–7 cm wide, shallowly 3-lobed, the apex acutus to caudatius, the base rounded, the upper and lower surfaces densely pubescent; stipules ovate, ca. 5 mm long, entire. Inflorescences densely pubescent with simple unicellular trichomes; pedicels 2.2–3.5 mm long. Hypanthium 6–7 mm long, 3–3.2 mm wide at the widest point, glabrous to sparsely pubescent with stellate trichomes at the base; sepals triangular, 5.5–6 mm long; ovules 5–6 per carpel.

**Distribution.** Known only from the type locality at Yunnan in China.


Shrubs to 1.3 m high, with erect or spreading branches, pubescent with capitate-glandular trichomes. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate, 4.5–6.5 cm long, 2.8–4.5 cm wide, shallowly 3-lobed, the apex acute to acuminate, the base cordato to rotund, the upper surface glabrous, the lower surface sparsely pubescent with capitate-glandular trichomes on the veins; petioles 1–1.5 cm long, pubescent with capitate-glandular trichomes; stipules ovate to lanceolate, 6–7 mm long, ciliate with capitate-glandular trichomes at the margin, deciduous after anthesis. Inflorescences racemes, 3.5–4.5 cm long, moderately pubescent with capitate-glandular trichomes, 4–5-flowered; flowers fascicled at the apex of the

Fig. 8. The distribution of *N. sinensis* var. *hypomalaca*. 

in inflorescence; bracts lanceolate, 4.6–5.1 mm long, ciliate with capitate-glandular trichomes at the margin; pedicels 3.8–5 mm long, pubescent with capitate-glandular trichomes. Hypanthium cylindric-campanulate to campanulate, 5.8–6.5 mm long, 4.5–5.1 mm wide at the widest point, glabrous or densely pubescent with capitate-glandular trichomes; sepals ca. 3.3 mm long, apiculate at the apex, pubescent on adaxial surface; petals obovate, white or pale pink; stamens 20–30, the longest filaments ca. 1.8 mm long; carpel 1, glabrous, moderately pubescent at the apex or densely pubescent throughout the surface; ovules 7 per carpel.

**Distribution.** Yunnan in China (Fig. 4); mixed deciduous forests; 2,750 m.

*Neillia sparsiflora* is characterized by having capitate-glandular trichomes on the flowering branches, veins of the lower leaf surfaces, petioles, stipule margins, bracts, and inflorescence. It is a rare species only known from four specimens collected from Yunnan in China (Rehder, 1920; Vidal, 1964; Cullen, 1971). This species is similar to specimens collected from Yunnan in China (Rehder, 1920; Iwatsubo and Naruhashi, 1993).

**Specimens examined.** CHINA. Yunnan: Dayao, under mixed forests, elev. 2,750 m, 4 Jun 1989, Bai et al. 209 (NY−2 sheets); circa Pe-yen-tsin, Kou-ty, in 1918, Ten 531 (A).


Shrubs to 2 m high, with erect or spreading branches. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate, 5–10 cm long, 3.5–8.5 cm wide, shallowly 3–5-lobed, the apex caudate, the base cordate, the middle lobes with 6–8 pairs of secondary veins, the upper surface glabrous, the lower surface sparsely pubescent; petals 1–1.5 cm long; stigmas ovate to lanceolate, 7–12 mm long, serrate or entire, persistent. Inflorescences panicles of racemes, 8–10 branched, 4–10 cm long, glabrous; bracts lanceolate, 3–5 mm long; pedicels 2.5–4 mm long. Hypanthium cupulate, 1–1.5 mm long, 2.3–3 mm wide at the rim, glabrous, capitate-glandular trichomes absent; sepals triangular to ovate, 1–1.8 mm long, apiculate at the apex, pubescent on adaxial surface; petals obovate, white; stamens 15–20, the longest filaments ca. 1 mm long; carpel 1, densely pubescent throughout the surface; ovules 2 per carpel. Follicles ca. 3 mm long, with more or less erect beaks; seeds 2 per follicle, 1.5–1.7 mm long, dark brown. Chromosome number: 2n = 18 (Iwatsubo and Naruhashi, 1993).

**Distribution.** Japan in Gunma, Kanagawa, Shizuoka, and Yamanashi prefectures (Fig. 9); rare; along streams; 200–1,300 m.

*Neillia tanakae* is morphologically similar to *Neillia incisa* and *Neillia hanceana* in having cupulate hypanthia, but differs from these two species in its 15–20 stamens per flower and 3–5-lobed leaves with acute or acuminate teeth. The overall leaf shape of this species resembles that of *Neillia splendida*. *Neillia tanakae* is mostly found in areas around Mt. Fuji, and it has been listed as an endangered species in Japan. Although Cullen (1971) contended that multiple, superposed buds are present in the leaf axils of flowering branches, I have not seen any specimens of *Neillia tanakae* with this characteristic.

**Fig. 9.** The distributions of *Neillia tanakae* and *Neillia uekii.*
Specimens examined. JAPAN. Honshu: Kanagawa Pref., Nakatsukyo, N foot of Mt Ooyama, Kiyokawa-mura, Aiko-gun, elev. 200 m, 24 Jul 1964, Fukuoka 6741 (NY, UC); Ashigarakami-gun, Kita-ashigara-mura, Tanzawa-Oyama Quasi National Park, half-way up from foot, 3 Oct 1958, Furuse s.n. (A); Sengaku hot well, Sengokubara moor, Hakone, 6 Sep 1951, Mizushima 1601 (A); Mt. Tanzawa, Kanayama-toge, elev. 800 m, 5 Aug 1963, Yamaizaki 7437 (A); Shizukuza Pref., Asaginikogen, W part of Mt Fuji, on grassy field, elev. 900 m, 21 Aug 1977, Murata et al. 33874 (A); Fumoto, Asagiri Highland, Fujimiya-shi, elev. 800 m, 19 Jun 1983, Togashi s.n. (A, NY, UC); Yamashita Pref., Minami-tsuru-gun, Nishikatsura-mura, foot of Mt Mitsuato, 31 Aug 1957, Furuse s.n. (A); Minami-kambara, Morimachi, 10 May 1952, Ikegami 19943 (A).


Shrubs to 1–2.5 m high, with erect or spreading branches. Leaves on the flowering branches without multiple, superseded buds in their axis; blades ovate to lanceolate, 2.5–10 cm long, 1.8–6.5 cm wide, shallowly 3-lobed or deeply 3–5-lobed, the apex acute to caudate, the base cordate to rounded, the upper and lower surfaces glabrous to sparsely pubescent; petioles 3–9 mm long; stipules ovate to lanceolate, 5–9 mm long, serrate or entire, deciduous after anthesis. Inflorescences racemes, 3–15 cm long, glabrous or densely pubescent, more than 20-flowered; flowers more or less evenly distributed along the inflorescence rachis; bracts lanceolate, 6–9 mm long; pedicels 0.6–2 mm long. Hypanthium cylindric-campanulate, 4.5–5.5 mm long, 2.8–4 mm wide at the widest point, glabrous or moderately pubescent, capitate-glandular trichomes developing after anthesis; sepals triangular, 1.8–4 mm long, acuminate or apiculate at the apex, pubescent on adaxial surface or both surfaces; petals orbicular or obovate, pale pink; stamens ca. 20; carpel 1, rarely 2, pubescent upper half; ovules 2–7 per carpel. Follicles 8–9 mm long, with more or less erect beaks; seeds 3–4 per follicle, ca. 2 mm long, dark brown.

Neillia thibetica is morphologically very similar to N. sinensis, but it can be distinguished from N. sinensis by its shorter hypanthia, shorter pedicels, and greater number of flowers per raceme. Three varieties can be recognized as follow:

1. Hypanthia glabrous .................................................................. var. duclouxii
1. Hypanthia pubescent.

2. Leaves shallowly 3-lobed; ovules 6–7 per carpel .......... var. thibetica
2. Leaves deeply 3-lobed; ovules 2 per carpel ........ var. lobata

10a. Neillia thibetica var. thibetica


Shrubs to 2.5 m high. Blades ovate, 5–10 cm long, 3–6 cm wide, shallowly 3-lobed, the apex acute to caudate, the base truncate to rounded; petioles 6–9 mm long; stipules ovate to lanceolate, 6–9 mm long, serrate or entire. Inflorescences densely pubescent, 6–15 cm long, more than 25-flowered; pedicels 0.6–2 mm long. Hypanthium 4.7–5.5 mm long, 2.9–3.8 mm wide at the widest point, moderately pubescent with simple unicellular trichomes, capitate-glandular trichomes developing after anthesis; sepals 2.5–4 mm long, acuminate at the apex, pubescent on both surfaces; ovules 6–7 per carpel.

Distribution. China in Sichuan (Fig. 10); 1,500–3,000 m.

Specimens examined. CHINA. Sichuan: Ta Kwan, Ta Hsiang Ling, elev. 2,400 m, 7 Aug 1939, Chiao 1633 (A); Ta Hsian Ling, elev. 2,400 m, 28 May 1922, Smith 2043 (A); Mupin, 29 May 1931, Wang 23084 (A); Ta-hsiang-ling, Ching-chi Hsien, Jun 1907, Wilson 2381 (A); Mupin, elev. 5,000–7,000 ft., Jun and Sep 1908, Wilson 916 (A, GH); Tachienlu, elev. 6,000–8,000 ft., Jul and Sep 1908, Wilson 974 (A); Mupin, Oct 1910, Wilson 4220 (A); Tachienlu, elev. 8,000 ft., Oct 1910, Wilson 4220a (A); O-pien Hsien, elev. 1,500 m, 14 May 1932, Yu 740 (A); Kangding Xian, elev. 3,000 m, 2 Jun 1981, Yu & Ku 113549 (A); Hanyuan Xian, Qingxixiang, elev. 2,000 m, 18 Jul 1989, Zhao 341 (NY).


![Fig. 10. The distribution of N. thibetica.](image-url)
Taxonomy of tribe Neillieae: Neillia

Shrubs to 2.5 m high. Blades ovate to lanceolate, 6–9 cm long, 2.5–6.5 cm wide, shallowly 3-lobed, the apex acuminate to caudate, the base cordate to rounded; petioles 6–9 cm long; stipules lanceolate, 6–9 mm long, entire. Inflorescences 6–12 cm long, glabrous, more than 25-flowered; pedicels 0.6–2 mm long. Hypanthium 4–4.5 mm long, 2.8–3.2 mm wide at the widest point, glabrous, capitate-glandular trichomes present; sepals 1.8–2 mm long, apiculate at the apex, pubescent on an axillary surface; ovules 6–7 per carpel.

**Distribution.** China in Sichuan and Yunnan (Fig. 10); 2,000 m.

Vidal (1963) distinguished *Neillia thibetica* var. *duclouxii* based on its glabrous inflorescences and hypanthia. Cullen (1971) questioned the validity of this taxon, because one of the paratypes (Wang 23084 at A) has densely pubescent inflorescences and hypanthia, suggesting that *Neillia thibetica* does not differ from var. *thibetica*. Because the holotype and other type materials have glabrous inflorescences and hypanthia, as in the original description of the taxon, I recognize var. *duclouxii* as a separate taxon. The paratype, Wang 23084, is placed under var. *thibetica* in this monograph.

**Specimens examined.** CHINA. Yunnan: Cheou Pa Ngay, prefect. Tchao Tong, 24 May 1906, *Dulcoux 4611* (P); Ta Eul, pres Tchen Hiong, 3 Jul 1907, *Ducloux 5215* (P); Chao-tung Hsien, elev. 2,000 m, 19 May 1932, *Tsai 50929* (A).


Shrubs to 1 m high. Blades ovate, 2.5–4.9 cm long, 1.8–3.2 cm wide, deeply 3-lobed, the apex acute to acuminate, the base cordate; petioles 3–7 mm long; stipules lanceolate, 5–6 mm long, serrate. Inflorescences 3–4 cm long, densely pubescent, ca. 20-flowered; pedicels 0.7–1.5 mm long. Hypanthium 4.5–5 mm long, 3–4 mm wide at the widest point, moderately pubescent with simple unicellular trichomes, capitate-glandular trichomes developing after anthesis; sepals 2.3–4 mm long, acuminate at the apex, pubescent on both surfaces; ovules 2 per carpel.

**Distribution.** China in Sichuan (Fig. 10); 2,900–3,000 m. *Neillia thibetica* var. *lobata* has been recognized as a separate species by Vidal (1963) and Cullen (1971). The leaves of this taxon are similar to those of *N. incisa* in being deeply 3-lobed. Otherwise *N. thibetica* var. *lobata* is very similar to *N. thibetica*.

**Specimens examined.** CHINA. Sichuan: inter Tu-yung-pu et Yen-yuan Hsien, elev. 3,000 m, 12 May 1914, *Schneider 4151* (A).


do not support the segregation of \textit{N. fallax}, described from Indonesia, is characterized by having glabrous inflorescences and glabrous carpels. Vidal (1963) recognized \textit{N. fallax} as a separate species, while Kalkman (1993) recognized it as a variety of \textit{N. thyrsiflora}. I do not support the segregation of \textit{N. fallax} as a distinct taxonomic entity because there is continuous variation in the characters that have been used to distinguish it from \textit{N. thyrsiflora}, such as leaf shape, inflorescence pubescence, number of stamens, and carpel pubescence.

**Specimens examined.** BHUTAN. Kamji, 19 Dec 1963, Bubbarao 273 (A).

CHINA. Guangxi: On Tak, 21 Sep 1935, Ko 55787 (A). Yunnan: Sichou Hsien, Faa-doou, elev. 1,450–1,550 m, 18 Sep 1947, Feng 11881 (A); Marlipo, Hwang-jin-i, elev. 1,100–1,400 m, 13 Nov 1947, Feng 13236 (A); Marlipo, elev. 1,600–2,000 m, 9 Dec 1947, Feng 13729 (A); Wen-shan-Hsien, Pyngbah, in open thickets, elev. 1,700–1,800 m, 10 Aug 1947, Feng 11044 (A); Mengtze, elev. 5,000 ft., without date, \textit{Henry} 9419 (A, MO); Mengtze, S. of E Mits, elev. 4,500 ft., without date, \textit{Henry} 9419 (NY); S of Red River, without date, \textit{Henry} 13653 (A); Szemao forest, elev. 4,500 ft., without date, \textit{Henry} 12275 (A, MO); above Kan San Chai, W of the Mekong, en route from Pingpo to Youngchang and Tengyueh, Salween watershed, Oct 1922, \textit{Rock} 7056 (A, NY); Fuchuan range, W of the Mekong-Salween divide and W of Wei-hsi, elev. 11,500 ft., Aug-Sep 1932, \textit{Rock} 23375 (NY); Lu-se, elev. 1,750 m, 10 Feb 1934, \textit{Tsai} 56895 (A); Pingbien Xian, in ravine, elev. 1,400 m, 15 Jun 1934, \textit{Tsai} 60207 (A); Pingbien Xian, on road side, 7 Jul 1934, \textit{Tsai} 62383 (A); Che-tse-lo, in forest, elev. 3,200 m, 9 Sep 1934, \textit{Tsai} 58432 (A); Dzung-duei, Cham-pu-tung, mountain slope, elev. 2,000 m, Oct 1935, \textit{Wang} 66940 (A); Lung-pan-la Champu-tung, meadow, elev. 3,000 m, in 1935-1936, \textit{Wang} 67076 (A); Kiukiang valley (Taron) Chiengen, elev. 1,650 m, 25 Jul 1938, \textit{Yu} 19409 (A); Kiukiang valley (Taron) Monting, elev. 1,350 m, 10 Sep 1938, \textit{Yu} 20199 (A); Salwin-Kiukiang Divide, Newahlung, elev. 2,200 m, 8 Jul 1938, \textit{Yu} 19228 (A); Mienning, Poshang, elev. 2,700 m, 9 Oct 1938, \textit{Yu} 17974 (A).

INDIA. Assam. Jaintea hills, Shillong, near a waterfall between Jowan & Jorain, 30 May 1965, \textit{Balakrishnan} 42220 (MO); Katapahar, elev. 7,000 ft., 28 Dec 1937, \textit{Biswas} s.n. (A, MO, NY); E Himalaya, Singmari, 5 Aug 1960, \textit{Biswas} s.n. (A); Sureil, elev. 5,000 ft., 29 Aug 1912, \textit{Cave} s.n. (A); E Himalaya, Ghum, elev. 7,500 ft., 4 Jul 1919, \textit{Cave} s.n. (A); Shillong, elev. 6,400 ft., 9 Aug 1885, \textit{Clarke} 387204 (P); Mingpoo, elev. 4,000 ft., 28 Jul 1919, \textit{Cooper} 556 (A); Sikkim, without date, \textit{Hook. f.} s.n. (A, GH, NY); E Bengal, without date, \textit{Griffith} 2115 (GH); Sinchal Lake, Darjeeling, elev. 8,000 ft., 15 Nov 1944, \textit{Rezzada} 19034 (A); Assam, Khasia and Jaintia Hills, elev. 5,300 ft., 12 Jun 1923, \textit{Ruse} 153 (A); Sureil, 7 Sep 1921, \textit{Wilson} s.n. (A–2 sheets).


MIYANNA. N. Triangle (Hkinkum), elev. 4,000 m, 10 Jul 1953, \textit{Kingdon-Ward} 21135 (A).

NEPAL. Gurke Bandhara to Charikot, elev. 6,000 ft., 10 Oct 1960, \textit{Banerji} 1210 (A); Bumlu Danda, elev. 6,500 ft., 11 Sep 1964, \textit{Banerji} 1326 (A); Tamur Valley, Newa Khola, elev. 5,000 ft., 8 Aug 1956, \textit{Stainton} 1292 (A).

VIETNAM. Ta Ya Ping, elev. 1,200 m, Sep 1942, \textit{Pételot} 7776 (P).

Korean name: Na-do-guk-su-na-mu (나도국수나무)


Shrubs to 2.5 m high, with erect or spreading branches. Leaves on the flowering branches without multiple, superposed buds in their axils; blades ovate, 5–7.7 cm long, 2.4–5.6 cm wide, shallowly 3-lobed, the apex acute to acuminate, the base cordate to rounded, the upper surface glabrous to sparsely pubescent, the lower surface sparsely to moderately pubescent; petioles 4–8 mm long; stipules elliptic or ovate, 4–8 mm long, serrate or entire, deciduous after anthesis. Inflorescences racemes, rarely panicles of racemes, up to 30-flowered, 3–8 cm long, sparsely pubescent with stellate trichomes; bracts lanceolate, 4–5 mm long; pedicels 2.5–3.5 mm long. Hypanthium campanulate, 2.5–3 mm long, 2–2.2 mm wide at the widest point, sparsely to moderately pubescent with simple unicellular trichomes, capitate-glandular trichomes developing after anthesis; sepals triangular, 2–2.4 mm long, acuminate at the apex, pubescent on both surfaces; petals obovate, white; stamens ca. 20, the longest filaments ca. 1.5 mm long; carpel 1, glabrous; ovules 2 per carpel. Follicles 8–10 mm long, with more or less erect beaks; seeds 2–3 per follicle, ca. 2.8 mm long, dark brown.

**Distribution.** Korea (Fig. 9); mixed deciduous forests.

**Neillia ukii** is morphologically distinct in the genus in having stellate trichomes on the inflorescence rachis. The presence of stellate trichomes, common in the species of *Physocarpus*, is unusual in the genus *Neillia*. This species has been known to be endemic to Korea, occupying thickets of mountain slopes in limestone areas. Gu and Alexander (2003) reported the distribution of the species in Changdian (SE Liaoning) near the border of North Korea. I have not seen a specimen from China.

**Neillia ukii** and *N. milsii* were published in the same year of 1912. According to Vidal (1963), the name *N. ukii* has priority because it was published in January, 1912, whereas *N. milsii* was published in March, 1912. Cullen (1971) cited Mills collection at A as an isotype of *N. milsii*, but this specimen does not bear a collection number. It is unclear whether or not *Mills s.n.* is the duplicate of *Mills 107*, although both were collected on the same day.

**Specimens examined.** KOREA. Pyeongan-buk-do: Okdang-ri, 4 Jun 1914, Nakai 1776 (A); in dumosis Pyeokdan, 12 Jun 1914, Nakai 1774 (A); side of stream, not common, around Mabon (Umsan), 28 Jun 1917, Wilson 8714 (A–2 sheets); Kakai [Kanggye], 5 Aug 1918, Wilson 10587 (A); Yengben, 30 Jun 1937, Smith s.n. (A); Pyeongyang-si in petrosis Pyeongyang, Jun 1901, Faurie 85 (A); Incheon: Ganghwa-gun, Gilsang-myeon, Donggeom-ri, Donggeomdo Island elev. 5 m, Kim Donggeom12298 (KB); Gyeonggi-do: Yeoju-gun, Heungcheon-myeon, Sangbakk-r, elev. 69 m, 30 Aug 2011, Kang sh20110830 (KB); Yeoncheon-gun, Wangning-myeon, Gojanha-ri, elev. 49 m, 23 Jul 2008, Lee et al. 2008661061 (KB); Gangwon-do: Chuncheon-si, Namsan-myeon, Baegyang-ri, Geombong, 21 May 2004, Heo & Choi 4416 (KB); Hongcheon-gun, Seo-myeon, Mt. Palbongsan, 15 May 2009, Heo et al. 377072-1055 (KB); Jeongseon-gun, Sindong-eup, Gasa-ri, Mt. Eunbongsan, elev. 507 m, 17 Sep 2012, Jeon 378151-0391 (KB); Wonju-si, Munmak-eup, Donghwa-ri, Sajemal, 17 Jul 2013, Jeong & Han Jul2013 (KB); Yeongwol-gun, Seo-myeon, Hutan-ri, Deulgol, elev. 197 m, 7 Jul 2009, Jong & Kim 0907008-1 (KB); Chuncheongbuk-do: Chugui-si, Gageum-myeon, Bonghwan recreational forest, 14 May 2009, Nam & Lee, VS210 (KB); Danyang-gun, Maepo-eup, Pyeongdong-ri, 12 Jun 2009, Nam VS192 (KB); Goesan-gun, Yeopung-myeon, Wonpung-ri, elev. 242 m, 12 May 2014, Kim & Kim SHYG51 (KB); Jecheon-si, Deoksan-myeon, Seongam-ri, elev. 166 m, 6 Jun 2013, Oh et al. J06B3004 (KB); Jincheon-gun, Mt. Dutasan, 8 Jul 2003, Paik 3312 (KB); Chuncheongnam-do: Donggju-si, Banpo-myeon, Hakbong-ri, Donghaksa, 3 Jun 2000, Ko & Kang 1447 (KB); Yesan-gun, Daehoi-ri, Mt. Kwanyangsan, elev. 500 m, along stream under mixed conifer forest, 25 Jul 2000, Oh 5010 (DAV); Jeollanam-do: Mt. Chirisan, 1 Aug 1934, Smith s.n. (A).

**Doubtful and excluded names**

The following names are excluded in this study because I have not located the type specimen and/or the original description.


**Acknowledgments**

I am grateful to Daniel Potter, Ellen A. Dean, James A. Doyle, and two anonymous reviewers for their comments and
suggestions on this manuscript, to Jean Shepard for managing specimen loans, and to John L. Strother and Kanchi Gandhi for sharing their comments on nomenclature. I also would like to thank the curators and staff of the herbaria listed in Materials and Methods for loans of herbarium specimens and for assistance during visits and to Suhua Shi, Yalin Peng, and Zong-Shu Yue for assistance and support with fieldwork in China. This research was supported in part by an NSF Doctoral Dissertation Improvement Grant DEB 0073041 to Daniel Potter and the author and the Eco-Innovation Project of the Ministry of Environment, Korea (Grant No. 416-111-005).

Literature Cited


