**ABSTRACT.** Recent phylogenetic analyses of tribe Neillieae in Rosaceae, which comprises *Neillia*, *Physocarpus*, and *Stephanandra*, based on both nuclear and chloroplast DNA sequences revealed that *Neillia* and *Stephanandra* together form a strongly supported monophyletic group and that species of *Stephanandra* are nested within *Neillia*. The close relationship between *Neillia* and *Stephanandra* is also supported by leaf morphology, inflorescence type, and carpel number. In order to better reflect the evolutionary relationships among species of *Neillia* and *Stephanandra*, based on molecular phylogenetic and morphological evidence, *Stephanandra* is united with *Neillia*, and three traditionally recognized species and a hybrid of *Stephanandra* are transferred to *Neillia*. This treatment results in new combinations as follows: *N. hanceana* (Kuntze) S. Oh, *N. incisa* (Thunberg) S. Oh, and *N. nakatsu-riparia* (H. Takahashi) S. Oh. *Stephanandra incisa* (Thunberg) Zabel var. *macrophylla* Hide H. Takahashi is treated as a new synonym of *Neillia incisa*.

**Key words:** *Neillia*, Rosaceae, *Stephanandra*.

*Neillia* D. Don is a small genus in Rosaceae with about nine species of deciduous shrubs, whose distribution ranges from the Himalayas across China to Korea in the east, and south to Indonesia (Vidal, 1963; Schulze-Menz, 1964; Cullen, 1971; Kalkman, 1993; but see Gu & Alexander, 2003). The genus *Stephanandra* Siebold & Zuccarini consists of three traditionally recognized species and a recently reported putative hybrid (Takahashi, 1991), indigenous to China, Taiwan, Korea, and Japan (Ohwi, 1965; Yu & Ku, 1974; Lee, 1980). The two genera, along with *Physocarpus* (Cambessèdes) Rafinesque, have been classified in the tribe Neillieae (Maximowicz, 1879), which is characterized within Rosaceae by lobed leaves with persistent or deciduous stipules and ovoid shiny seeds with copious endosperm (Vidal, 1963; Oh & Potter, 2005). The monophyly of the tribe is strongly supported by chloroplast DNA sequence data, including *rbcL* (Morgan et al., 1994) and *matK* and *trnL* genes (Potter et al., 2002). Potter et al. (2002) included all three genera within Neillieae and showed that *Neillia* and *Stephanandra* are more closely related to each other than either is to *Physocarpus*. Furthermore, *Physocarpus* is quite morphologically distinct from *Neillia* and *Stephanandra* in having stellate trichomes, corymbose inflorescences, and inflated follicular fruits dehiscent along both ventral and dorsal sutures.

*Neillia* and *Stephanandra* have been distinguished based on characters in fruits and seeds (Vidal, 1963; Cullen, 1971), but my examination of herbarium specimens, including the type collections, indicates that the two genera are not clearly separable with these characters. Vidal (1963), in his revision of *Neillia*, stated that follicles of *Stephanandra* incompletely dehisce at maturity, whereas those of *Neillia* are completely dehiscent. However, the mature follicles of some species of *Neillia*, such as *N. sinensis* Oliver, *N. thibetica* Bureau & Franchet, and *N. ukeii* Nakai, are not completely dehiscent, with the result that seeds are retained within the follicles, as in the species of *Stephanandra*. Cullen (1971) explained that *Neillia* differs from *Stephanandra* by having a smooth seed coat (vs. crustaceous). While the seed coat of *S. chinensis* Hance and *S. incisa* (Thunberg) Zabel is more or less papillate, there is no distinction in seed coat ornamentation between *S. tanakae* (Franchet & Savatier) Franchet & Savatier and *Neillia*, all of which have smooth surfaces. Vidal (1963) and Cullen (1971) argued that the styles of *Stephanandra* become lateral in fruits, but the majority of specimens of *Stephanandra*, especially of *S. tanakae*, exhibit terminal styles. They (Vidal, 1963; Cullen, 1971) also contended that follicles of *Neillia* contain more seeds than those of *Stephanandra* (2 to 10 vs. 1 or 2), but this can be considered as continuous variation across the two genera.

Phylogenetic analyses using DNA sequence data encompassing both chloroplast and nuclear genes, separately and in combination, have suggested that *Neillia* and *Stephanandra* together form a strongly supported clade and that recognition of two genera, as currently circumscribed, results in a non-monophyletic grouping with *Stephanandra* nested within *Neillia* (Oh & Potter, 2003, 2005). DNA sequence data of chloroplast *trnl-trnf*, *trnD-trnT*, *matK-trnK*, and *psbA-trnK* gene regions and the second intron of the floral homeotic gene, LEAFY, congruently supported that *Stephanandra* is monophyletic and nested.
within Neillia, making Neillia a paraphyletic genus (Oh & Potter, 2003, 2005). Spacer regions of nuclear ribosomal DNA (Internal Transcribed Spacer and External Transcribed Spacer) data, however, did not support the monophyly of Stephanandra, placing S. tanakae as sister to the weakly supported clade of Neillia, S. incisa, and S. chinensis, but neither Stephanandra nor Neillia was supported as monophyletic (Oh & Potter, 2003, 2005).

The close relationship between Neillia and Stephanandra is also supported by several morphological characteristics; species in both genera have ovate to lanceolate leaves with acuminate to caudate apices, racemose or paniculate inflorescences, and a single (rarely two) carpel per flower, with the exception of N. affinis Hemsley var. polygyna Cardot ex J. E. Vidal, which has three to five carpels per flower. Neillia, however, differs from Stephanandra by having campanulate or cylindrical hypanthia (vs. cupulate), with capitate glandular trichomes developing at the fruiting stage (Yu & Ku, 1974; Gu & Alexander, 2003; Oh & Potter, 2005). The cupulate hypanthium in Stephanandra represents a reversal to the ancestral state if elongation of the hypanthium (campanulate or cylindrical) is a synapomorphy for the Neillia-Stephanandra clade (Oh & Potter, 2005).

In order to better reflect evolutionary relationships based on molecular and morphological evidence, Oh and Potter (2005) recommended that Neillia and Stephanandra be merged into one genus, in which case the name Neillia (Don, 1825) should be used because it has priority over Stephanandra (Siebold & Zuccarini, 1843). I herein transfer the species of Stephanandra to Neillia.

1. Neillia hanceana (Kuntze) S. Oh, comb. nov.

When Stephanandra chinesis is transferred to the genus Neillia, the name N. chinensis cannot be used because of the prior existence of N. sinensis (Oliver, 1886). The epithets, chinesis and sinensis, are considered as confusingly similar and are treated as homonyms when they are based on different types (cf. Article 53.3; Greuter et al., 2000).

When Kuntze (1891) merged Neillia and Stephanandra into Physocarpus, he published Physocarpus hanceanus based on Stephanandra chinensis. Although Kuntze (1891) did not explain the rationale behind the nomenclature of P. hanceanus, it should be considered as a new replacement name, not as a superfluous name. In his taxonomic treatment, Kuntze (1891) simultaneously transferred both Stephanandra chinensis and Neillia sinensis to the genus Physocarpus. Because he published a new combination P. sinensis (Oliver) Kuntze based on the latter name, Kuntze himself made the epithet chinensis unavailable in Physocarpus in the sense of Article 53.3 (Greuter et al., 2000). Thus, P. hanceanus is a legitimate replacement name for S. chinensis to avoid simultaneous homonymous combination (cf. Article 11A, Note 1; Greuter et al., 2000). Since the final epithet hanceana is available in Neillia, it is adopted in this new treatment.

The leaves of Neillia hanceana are very similar to those of N. sinensis, such that it is difficult to identify the species without flowering material. The two species, however, are easily distinguished by floral characters: Neillia hanceana has panicles of white flowers with cupulate hypanthia, whereas N. sinensis has racemes of pink flowers with cylindrical hypanthia.

**Distribution and habitat.** Endemic to southeastern and north central China; moist, open thickets and along streams on slopes under tempered deciduous forests; common; elev. 350 to 1100 m.


2. Neillia incisa (Thunberg) S. Oh, comb. nov.


**Neillia incisa** is widely distributed in eastern Asia, and plants of the species are commonly found in mixed deciduous forests in Korea and Japan. It is quite variable in leaf size and margin. However, there is no clear geographic correlation with the variation of the characters within *N. incisa*. For example, plants with very small leaves and three to five deeply incised lobes (e.g., *H. Muroi 2155*) occur in Cheju Island of Korea, Taiwan, and Japan, while individuals with relatively large leaves and three shallowly incised lobes (e.g., *T. Iwasaki s.n.*) are also found in these regions.

**Stephanandra flexuosa** was first described by Siebold and Zuccarini (1843) from Japan, based on which the genus *Stephanandra* was segregated. It was, however, cited as a taxonomic synonym of *Stephanandra incisa* when Zabel (1885) transferred Spiraea incisa to *Stephanandra*, which has been widely accepted by many authors (Rehder, 1940; Hutchinson, 1964; Yu & Ku, 1974; Gu & Alexander, 2003). Pampanini (1910) published *S. flexuosa* var. chinensis on the basis of *S. chinensis*, and this variety refers to *N. hanceana*.

Nakai (1926) distinguished *Stephanandra quadriifissa* from *S. incisa* on the basis of its leaves deeply divided into five lobes, four of which being more or less equal in size. Lee (1966, 1980) treated *S. quadriifissa* as a variety of *S. incisa*, and stated that it is also distributed on Cheju Island. I requested the type specimen of *S. quadriifissa* from TI, but received no response. Examination of herbarium specimens and field observations in Korea, including Cheju Island, suggest that there may be a few individuals clearly referable to *S. quadriifissa* (e.g., Taquet 2806), but that the degree of incision of leaf margin is variable within individuals in the populations.

Takahashi (1991) described *S. incisa* var. macrophylla on the basis of its larger leaves and ovate stipules, reporting the taxon on the Izu Islands, including the islands of Oshima, Jiijima, Kozushima, and Mikurajima. Takahashi (1991) ascribed the distinctive features of *S. incisa* var. macrophylla to the maritime environment on the islands. However, some specimens from Oshima Island (e.g., Y. Satake & K. Okamoto 49 at A, NY, UC) do not have such features, and there are collections from the main island of Japan (e.g., Wilson 6812) that do show the characteristics. Therefore, I do not recognize *S. incisa* var. macrophylla as a distinct taxon.

**Distribution and habitat.** Widespread from Taiwan, northeastern China, Korea, to Japan; moist, open places and streamside in temperate mixed deciduous forests; common; 10 to 2000 m.


**Neillia tanakae** is morphologically similar to *N. incisa* and *N. hanceana* in having cupulate hypantheria, but differs from these two species in its 15 to 20 stamens per flower and shallowly 3-lobed leaves with acute or acuminate lobe apices. Plants of this species only occur in the areas around Mts. Fuji and Haruna 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 *N. tanakae* with this characteristic. This feature, however, is occasionally found in *N. incisa*.
Distribution and habitat. Restricted to Gumma, Kanagawa, Shizuoka, and Yamanashi prefectures of central Honshu in Japan; along streams in temperate mixed deciduous forests; rare; 200 to 1300 m.

Selected specimens examined. JAPAN. Honshu: Kanagawa Pref., Nakatsukyo, N foot of Mt. Oyama, Kiyokawamura, Aiko-gun, N. Fukuoka 6741 (NY, UC).


This hybrid taxon as described by Takahashi (1991) is morphologically similar to Neillia incisa, but exhibits characters intermediate between N. incisa and N. tanakae in leaf margin, stipule size, and particularly stamen number, which has been used as a diagnostic character to distinguish the two species (Ohwi, 1965). Takahashi (1991) stated that some of the anthers did not mature and that seeds were not developed. Because N. incisa and N. tanakae are also distributed in the region where N. × nakatsu-riparia was described, the area around Mt. Fuji in Japan appears to be a hybrid zone for N. incisa and N. tanakae. Chromosome number of this hybrid is unknown, but the putative parents are both diploid with 2n = 18 (Iwatsubo & Naruhashi, 1993).

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