



Short Communication

Epitypification of *Prunus* × *nudiflora* (Rosaceae), a natural hybrid species in Jeju Island, KoreaChangkyun Kim^a, Chan-Soo Kim^b, Jeong-Hwan Mun^c, Joo-Hwan Kim^{a,*}^a Department of Life Science, Gachon University, Seongnam 13120, South Korea^b Warm-Temperate Research Center, Korean Forest Research Institute, Seogwipo 63582, South Korea^c Department of Bioscience and Bioinformatics, Myongji University, Yongin 17058, South Korea

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ABSTRACT

Prunus × *nudiflora* is an endemic species to Jeju Island, South Korea and economically important as ornamentals. According to recent molecular phylogenetic and genomic studies, this species is revealed as a F1 hybrid originating from a cross between maternal *Prunus pendula* f. *ascendens* and paternal *Prunus jamasakura*. However, the plate specimen designated as type materials of *P.* × *nudiflora* does not permit a precise application of the name because of its poor condition. The herbarium specimens related with that illustration were examined to clarify the identity of *P.* × *nudiflora*, and an epitype is selected. Our epitypification proposed here will ensure nomenclatural accuracy for most material from cultivation, where the name *P.* × *nudiflora* is widely used.

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Introduction

Prunus × *nudiflora* (King cherry; Rosaceae), endemic to Jeju Island, South Korea, was originally described by Koehne (1912: 507) as *Prunus yedoensis* var. *nudiflora* and later raised to the rank of species (*P. nudiflora*; Koidzumi 1932: 178). Five wild populations of the King cherry are confined to a deciduous broadleaf forest of Mt. Halla, Jeju Island, at 450–900 m above sea level, and the estimated number of mature individuals is very small (NIBR, 2014). Owing to its extremely narrow geographic range and small number of adult individuals, *P.* × *nudiflora* is listed as “endangered (ER)” according to the IUCN categories (IUCN, 2012; NIBR, 2014). Therefore, this species has raised great concern among conservationists.

Prunus × *nudiflora* is morphologically similar to the Japanese cultivar *P.* × *yedoensis* Matsum. (Somei-yoshino). Thus, nomenclature of *P.* × *nudiflora* has been long neglected or confused with the Japanese cultivar *P.* × *yedoensis* in Korea (Lee and Kim 2007; Kim and Kim 2011). Although *P.* × *nudiflora* was originally characterized by long pedicel (27–35 mm in *P.* × *nudiflora* vs. 10–19 mm in *P.* × *yedoensis*; Koehne 1912), the taxonomic identification of this species

is difficult because of its high degree of variability of quantitative characters in vegetative and reproductive organs (Kim et al 1998). Using 18 quantitative morphological characters from flowers, leaves, fruits, and seeds, Kim et al (1998) found that overlapped variation in all characters was shown between *P.* × *nudiflora* and *P.* × *yedoensis*. Nevertheless, the hair density on the outer bud scale is important for the delimitation of *P.* × *nudiflora* (sparse in *P.* × *nudiflora* vs. dense in *P.* × *yedoensis*; Katsuki and Iketani 2016).

Katsuki and Iketani (2016) proposed that *P. itosakura* (Siebold) Masam. & Suzuki and *P. sargentii* (Rehder) H.Ohba are the putative parental species of *P.* × *nudiflora*. However, according to recent molecular phylogenetic and genomic studies using the next generation sequencing technology (Cho et al 2017; Baek et al 2018), *P.* × *nudiflora* is a F1 hybrid originating from a cross between maternal *P. pendula* f. *ascendens* Makino and paternal *P. jamasakura* Siebold ex Koidz, and this species can be clearly distinguished from its confusing cultivated species *P.* × *yedoensis* which is resulted from a hybridization event between *P. lannesiana* E.H.Wilson and *P. pendula* (Liegel) K.Koch (Innan et al 1995; Nakamura et al 2015) or between *P. itosakura* Siebold and *P. speciosa* (Koidz.) Ingram (Katsuki and Iketani 2016). Therefore, morphological and molecular evidence indicates that *P.* × *nudiflora* is distinctive for identification as a separate hybrid species from *P.* × *yedoensis*.

Koehne (1912) cited a specimen (label: “Quelpaert: Hoatien, 600 m, 14 April 1908, “Taquet 4638”) of *P. yedoensis* var. *nudiflora* as a type in

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the protologue. At the KYO, we found the specimen annotated as “isotype” for this species, but it is different from the original specimen information (i.e. “Taquet 4688”, not “Taquet 4638”; Figure S1). Moreover, as this type contains only pieces of floral, leaf, and branch, it cannot be identified for the purposes of precise application of the name *P. × nudiflora*. It seems hence evident that the name of *P. × nudiflora* needs to be unambiguously applied through designation of an epitype.

The nomenclature for the genus name (*Prunus* or *Cerasus*) of *P. × nudiflora* has been under discussion (Ohba 1992; Shi et al 2013). Shi et al (2013) suggested a broad-sensed genus *Prunus* based on its monophyly, morphological consistency, same number of basic chromosome ($\times = 8$), and occurrence of natural hybridization between apricots, plums, and dwarf cherries. Moreover, more

taxonomists have preferred to use *Prunus* in the broad sense (e.g. Rehder 1940; Wen et al 2008; Chin et al 2014). Following Shi et al (2013)' suggestion, we use the genus name *Prunus* for the King cherry. In this study, to ensure nomenclatural precision, we designate a specimen of *P. × nudiflora* collected from type locality of Jeju Island as the epitype (Figure 1).

Material and methods

Samples of *P. × nudiflora* were collected from morphological comparison from the type locality (Seogwipo-si, Jeju Island). Voucher specimens were deposited at GCU. We compared them with previous descriptions in the literature (Kim et al 1998; Katsuki and Iketani 2016) and herbaria specimens of *P. × nudiflora* in



Figure 1. A, Epitype of *Prunus × nudiflora* (J.-H. Kim & C.Kim 2019-1; GCU) designated in this study. B, Flowers of *P. × nudiflora* (Jeju Island, 13 April 2019).

Table 1. Comparison the morphological key characters of our specimens with the previous descriptions of *P. × nudiflora* and *P. × yedoensis*.

Morphological characters	In this study	<i>P. × nudiflora</i>	<i>P. × yedoensis</i>
Length of pedicel (cm) ^a	1.2 – (1.6 ± 0.3) – 2.8	0.7 – 3.3	2.0 – 3.1
Hair on the bud scale ^b	Spare	Spare	Dense

^a Kim et al (1998).^b Katsuki and Iketani (2016).

Gachon University (GCU), Kyoto University (KYO), and Warm-Temperature and Subtropical Forest Center, Korea Forest Research Institute (WFRC). As diagnostic morphological characters, we examined pedicel length and hair density on the outer bud scale because of their potential for identification of *P. × nudiflora*.

Results and discussion

Epitypification of *Prunus × nudiflora*

The diagnostic characteristics of our materials collected from Jeju Island were found to be similar when compared with the literature of *P. × nudiflora*. The pedicel length (1.6 ± 0.3 cm) of our materials is mainly within the range of *P. × nudiflora* (Table 1). Moreover, all our specimens examined share spare hair on the bud scale. Based on these morphological characteristics, we designate a specimen collected from type locality of *P. × nudiflora* as the epitype as follow.

***Prunus × nudiflora* (Koehne) Koidz. (1932: 178)**

[*Prunus pendula* f. *ascendens* × *P. jamasakura*]

≡ *Prunus yedoensis* var. *nudiflora* Koehne (1912: 507)

≡ *Cerasus × nudiflora* (Koehne) T.Katsuki & Iketani (2016: 1417)

Holotype. KOREA. Quelpaert, 600 m, 14 iv 1908, Taquet 4638 (holotype: not found; isotype: KYO00081192!)

Epitype (designated here). KOREA. Sinrye-ri 2-1, Namwon-eup, Seogwipo-si (GPS: N 33° 21'45.2; E 126° 35'51.3), 13 iv 2019, J.-H. Kim & C. Kim 2019-1 (GCU, KH); 13 iv 2005, C.-S. Kim et al 20061 (WFRC)

Conflict of interest

The authors declare that there is no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.japb.2019.09.006>.

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