

The Importance of Using Correct Names in Taxonomy - A Case Study of "The Genera of Vascular Plants of Korea" and Other Recent Published Literature in Korea

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Abstract : We scrutinized the Korean taxonomic literature, with special focus on some nomenclatural points and four different cases were listed categorically. Several naked names (*nomen nudum*), invalidly published names, typographical and orthographical errors, incorrect use of hybrid names and authorship, and errors in the citation of the bibliographic references have appeared in newly published literature in Korea, due to misapplications of ICBN (International Code of Botanical Nomenclature). Although literature review and synonyms are imperative and essential elements of taxonomic study, many author citations tend to be copied from one publication to another without any confirmation of the original source. It is strongly recommended that scientists who have previously published careless work should be more careful, and they should be instructed to read original descriptions and to learn current practices in the code.

Key words : *invalid names, synonym, the genera of vascular plants of Korea, type concept*

The 21st Century Frontier R & D Program of the Ministry of Science and Technology (2000-2003) and the Eco-Technopia-21 project of the Ministry of Environment (2004-2010) in Korea have supported the New Flora of Korea project. The first publication was issued as The Genera of Vascular Plants of Korea (Park, 2007b) recently and the consolidated version, which will contain eight volumes, will be published soon. Even though this project has updated numerous scientific names and corrected some of the citations on Korean plants, there is still a lack of accuracy in the nomenclature that deserves attention. Since the rules of nomenclature have been violated due to unawareness and ignorance by Korean taxonomy researchers themselves, a large number of cases from several publications have been highlighted previously (Chang and Kim, 2002; Kim *et al.*, 2005). These errors should be clarified categorically and brought to the attention of taxonomy researchers and students.

The aim of this paper was to review the Korean taxonomic literature, focusing on some nomenclatural points defined by the International Code of Botanical Nomenclature, Vienna (McNeill *et al.*, 2006).

Results and Discussion

1. Use of invalidly published names or invalidly published combinations

The nomenclatural status of a certain number of taxa needs to be revised, irrespective of their taxonomical treatments in The Genera of Vascular Plants of Korea.

Numerous new Korean woody plant species were described in Japanese in the first chapter of the Handbook of Korean and Mandshurian Forestry (Kaburaki, 1940). According to the International Code of Botanical Nomenclature, a new taxon should be described in Latin after 1 January 1935. Therefore, all new names in the Handbook of Korean and Mandshurian Forestry were not validly published under Article 36. Such invalid [*Rubus tozawai* Nakai ex Kawamoto: published on Handbook of Korean and Mandshurian Forestry, erroneously cited as Illustrated Manual of Korean Trees and Shrubs (Kawamoto, 1943) in The Genera of Vascular plants of Korea] or invalid combination names [*Rubus tozawai* var. *longisepalus* (Nakai) J. Y. Yang]. can still be found in The Genera of Vascular Plants of Korea (Pak and Yang, 2007).

Another problem in this book was that all new names were always given with Nakai as an authorship, although Nakai (Nakai, 1952) cited authorship for these new names as Nakai ex Kawamoto. It is assumed that

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'Kawamoto, Taigen' [河本台鉉 = Chung, T.H. (鄭台鉉, his Korean name)], who was a Korean botanist at that time, was an author on this book. Due to this ambiguous authorship problem, much of the literature used the authorship with the published book name for these names, such as Nakai ex Handb. [e.g., *Rubus crataegifolius* var. *subcuneatus* Nakai ex Handb (Lee, 1966; Suh *et al.*, 2006)], although the code (article 46.4) emphasized that authorship, followed by "ex", be inserted before the *nomen novum* of the publishing author. Publishing literature, such as The Genera of Vascular Plants of Korea (Park, 2007b), using these invalid names creates more confusion and causes formidable problems.

Mori (1922) gave no descriptions in 'An Enumeration of Plants Hitherto Known from Corea', merely listing numerous new names of Korean taxa. In order to be a validly published name, even before 1 January 1935, a new taxon should be described by a modern language description; therefore, the Mori work used invalid names. It is not uncommon that these invalid names have been published as correct names in numerous Korean literature, e.g. *Rosa acicularis* var. *globularis* Nakai ex Mori (Suh *et al.*, 2006; see below Misapplication of type concept, Suh *et al.*, 2006; Suh *et al.*, 2008a).

Invalidly published combination names in The Genera of Vascular Plants of Korea should be corrected according to article 32.1 (Chang, 2007a; Chang, 2007b), *Clematis fusca* var. *coreana* (H. Lév.) Nakai (Nakai, 1918b) and *Rhododendron yedoense* f. *poukhanense* (H. Lév.) Sugimoto (Sugimoto, 1972) should be corrected to *Clematis fusca* var. *coreana* (H. Lév.) Nakai ex M. Johnson (Johnson, 2001) and *Rhododendron yedoense* f. *poukhanense* (H. Lév.) M. Sugim. ex T. Yamaz. (Yamazaki, 1996), respectively.

Siebold et Zuccarini (1846) published several names without description or diagnosis, such as *Machilus japonica* Siebold & Zucc. and *M. thunbergii* Siebold & Zucc., but Chung M.G. (2007) used these names without confirmation of literature. These names should be changed to *M. japonica* Siebold & Zucc. ex Meisn., and *M. thunbergii* Siebold & Zucc. ex Meisn (1864).

Nakai (1913) simply listed many Korean taxa without descriptions, but later he described these taxa in other literature. In The Genera of Vascular Plants of Korea, *Filipendula glaberrima* (Nakai) Nakai (Kim, K.J., 2007) should be given as *F. glaberrima* Nakai because *Filipendula camtschatica* var. *glaberrima* Nakai was a *nomen nudum* (Nakai, 1913) and was published later as a species, *F. glaberrima* Nakai (Nakai, 1914). Also, *Cardamine leucantha* var. *koreana* Nakai was not validly published in 1913 due to absence of description, but later was published validly and effectively by Nakai as *Cardamine leucantha* var. *coreana* Nakai (1914). Later

this taxon was recognized as a species by Nakai (1952). Although Nakai (1952) used '*koreana*' as a basionym instead of '*coreana*', the correct name should be cited as *Cardamine coreana* (Nakai) Nakai, not *Cardamine koreana* (Nakai) Nakai (Oh, 2007a).

According to article 37.6, when a new name is published on or after 1 January 1990, indication of the type must include *typus* or *holotypus*, or its abbreviation or its equivalent in a modern language. It was found that *Luzula odaesanensis* Y. N. Lee and Y. O. Chae has never been published validly, since it was published by Lee (1996) without citing the type at all. The name which Lee (1996) presented was without question incorrect, and this name should be newly validated by including the type. In addition to this case, three new described taxa of *Asiasarum*, *Asiasarum koreanum* J.G. Kim and C.S. Yook was not validly published under Article 37.7 of the ICBN because Yook and Kim (1996) failed to fully cite the type. Several new and combination names such as genus *Asarum* was made by Oh (2008) without noticing this problem. Therefore, *A. koreana* (J.G. Kim and C. S. Yook) B.U. Oh is an invalidly published combination and should be newly described.

2. Typographical and orthographical errors, incorrect use of hybrid names and authorship, and errors in the citation of the bibliographic references

According to Appendix I of the Code (names of hybrids, H.3.1), the hybrid nature of a taxon is indicated by placing the multiplication sign before the epithet in the name of an interspecific hybrid. Therefore, two incorrect hybrid names in The Genera of Vascular Plants of Korea, *Pinus rigida*×*taeda* (Sun, 2007) and *Broussonetia kazinoki*×*papyrifera* (Chung, Y.C., 2007) should be expressed as *Pinus rigida* Mill.×*P. taeda* L. and *Broussonetia kazinoki* Siebold×*B. papyrifera* (L.) L'Hér. ex Vent., respectively. In contrast to these cases, the name *Scirpus juncooides* Roxb.×*S. wallichii* Nees (Oh, 2007) followed the code correctly in this flora.

According to International code of nomenclature for cultivated plants, epithets in names published in conformity with botanical Code may be used epithets, when cultivar is considered to be the appropriate status for the groups concerned (McNeill *et al.*, 2006). *Populus nigra* var. *italica* Koehne (Park W.G., 2007) should be expressed as *Populus nigra* 'italica'. Also *Populus euramericana* Guinier (Paek, 2007) should be changed to *Populus* × *canadensis* Moench, because it is the hybridization plant according to Appendix I of the Code (H. 1. 1).

Sun (2007) in The Genera of Vascular Plants of Korea regarded *Picea pungsanensis* Uyeki (1926) as a *nomen nudum* because this name was assumed to be merely given with Japanese description for Korean Timber

Trees. He therefore took *Picea pungsanensis* as having been first validly published by Nakai (1941) and cited Uyeki ex Nakai. However, this is incorrect. This name was accompanied by the Japanese description and was validly and effectively published by Uyeki under article 36.1.

Code 60.1 indicates that the original spelling of an epithet is to be retained, except for the correction of typographical or orthographical errors. *Geranium taebaek* S.J. Park and Y.S. Kim, however, was published by Park and Kim (1997), but the specific epithet 'taebaek,' which was derived from a geographical name (mountain name), was not latinized by the authors and this name should be treated as an orthographical error (Park, S.J., 2007). The correct name should be *Geranium taebaekensis* S.J. Park and Y.S. Kim under 60D.1.

Another example is *Commelina minor* Y. N. Lee and Y. C. Oh (Lee, 1981). The specific epithet 'minor' was used by the original authors, but the name 'mina' was adopted (i.e., *C. mina* Y.N. Lee and Y.C. Oh) in The Genera of Vascular Plants of Korea (Lee, 2007). It seems to be a somewhat arbitrary change, and the original name, *C. minor* Y.N. Lee and Y.C. Oh should be used as the correct name (Lee, 1981). Also, Lee S.T. (2007a) should use the specific epithet 'uekii' for *Neillia uekii* Nakai (1912), not 'ueki'.

Chung, M.G. (2007) used *Actinodaphne lancifolia* (Siebold and Zucc.) Meisn., not *A. lancifolia* (Blume) Meisn. Originally Blume (1851) described *Iozoste lancifolia* for this taxon, while Chung cited *Daphnidium lancifolium* Siebold & Zucc., which was an invalidly published name (nomen nudum) by Siebold & Zucc (Siebold and Zuccarini, 1846). Currently, *Listea coreana* H. Lév. is used correctly, because *L. lancifolia* Hook. f. was already used for another taxon and the basionym 'lancifolia' sensu Blume can no longer be used due to a later homonym.

Several citations were vague or inaccurate in The Genera of Vascular Plants of Korea. The name *Scutellaria pekinensis* var. *transitra* (Makino) H. Hara ex H.W. Li was used by Suh (2007), but the publication of the combination was correctly done by Hara (1948) and should be cited without the latter author, H. W. Li. Also, *Pulsatilla cernua* (Thunb.) Bercht. and J. Presl. var. *koreana* (Yabe and Nakai) U. C. La (Im, 1996) was cited erroneously as U. C. without mentioning the last author name (Park, 2007a). *Adenophora racemosa* J.K. Lee and S.T. Lee (Lee and Lee, 1990) was published in the Korean Journal of Plant Taxonomy in volume 20 starting at page 122, but it was cited incorrectly as volume 20 starting at page 121 (Yoo, 2007). It was not difficult to find these kinds of errors as well [e.g., *Sciadopitys verticillata* (Thunb.) Siebold & Zucc. Flora Japonica 2: 3,

1842, not 2: 1, 1842 (Sun, 2007); a basionym of *Actinidia polygama* (Siebold & Zucc.) Maxim., *Trochostigma polygama* Siebold & Zucc., Abhandlungen der Mathematische-Physikalischen Classe der Königlich Bayerischen Akademie der Wissenschaften 3: 728, 1843, not 3: 727 (Oh, 2007b)].

3. Misapplication of type concept and confusion of invalid names with synonyms

Recent publications (Shin and Kim, 2007; Suh *et al.*, 2006, 2008a, 2008b) about type specimens showed numerous mistakes and errors due to misapplications of ICBN (International Code of Botanical Nomenclature). The main cause of these errors was the treatment of invalidly published names as synonyms.

Under article 12.1, a name of a taxon has no status under this Code unless it is validly published. Since many taxa were not validly published by Kawamoto (1943) and Mori (1922), several of the lectotypes or syntypes indicated by Suh *et al.* (2006; 2008a; 2008b) are incorrect. Suh *et al.* (2006) listed either holotype or syntypes of many invalid taxa, such as *Rosa acicularis* var. *globularis* Nakai ex Mori (Mori, 1922) (*nomen nudum*), *Acer gimala* var. *divaricatum* Nakai ex Mori (Mori, 1922) (*nomen nudum*), *Rosa acicularis* var. *polyphylla* Nakai ex Mori (Mori, 1922) (*nomen nudum*), *Rubus phoenicolasius* var. *albiflorus* Nakai ex Mori (Mori, 1922) (*nomen nudum*), *Rubus coreanus* var. *concolor* Nakai (Nakai, 1915b) (*nomen nudum*), *Philadelphus scaber* var. *glabrescens* Nakai (Kawamoto, 1943; Nakai, 1952) (without Latin description and no indication of type specimen), *Rubus crataegifolius* var. *horridus* Nakai (Nakai, 1952) (unclear indirect citation), *Rubus crataegifolius* var. *subcuneatus* Nakai ex Kawamoto (Kawamoto, 1943) (without Latin description and no indication of type specimen), *Rubus longisepalus* Nakai ex Kawamoto (Kawamoto, 1943) (without Latin description and no indication of type specimen), and *Rubus tozawai* Nakai ex Kawamoto (Kawamoto, 1943) (without Latin description and no indication of type specimen).

Suh *et al.* (2006) and Ohba (1992) applied the same type to both *Sedum prostratum* Nakai (Nakai, 1935) and *Sedum zokuriense* Nakai (1939). Holotype and isotype for *S. prostratum* were indicated by Ohba (1992) and Suh *et al.* (2006), while different types, i.e., lectotype and isotype, were given for *S. zokuriense*. In order to clarify this confusion, we investigated the original publications. *S. prostratum* was originally described by Nakai (1935) in Japanese without a Latin description and no indication of the type, which was invalidly published. Nakai mentioned only one specimen for *S. zokuriense* as a type, but Suh *et al.* (2006) found several duplicate specimens from TI and indicated a lectotype

and isotypes. If there are several specimens for any taxon, the lectotype with isolectotype(s) from the original collections should be chosen. Additionally, the original publication of *S. zokuriense* Nakai (1939) was published in the Journal of Japanese Botany 15: 674, but Suh *et al.* (2006) cited the incorrect page number for this taxon (15: 647). It led us to conclude that Suh *et al.* (2006) took the citation and type information from Ohba (1992) without confirmation from the original publication. These invalid names with 'syntypes' or 'holotype' information are currently presented on the website of the University of Tokyo (<http://www.um.u-tokyo.ac.jp/dm2k-umdb/umdb/SK/db.html>).

We also noticed similar problems in the Shin and Kim (2007) study. When Nakai (1914) published *Berberis amurensis* var. *latifolia* Nakai, he clearly indicated a holotype for this taxon. However, Shin and Kim mentioned syntypes wrongly due to the presence of several duplicate specimens of type designated by Nakai. Among these duplicate type specimens, a lectotype with isolectotypes should be designated based on the protologue of *B. amurensis* var. *latifolia*. Also, Nakai (1917) originally cited two syntypes (Nakai 4166, 4167) for *Carex blepharicarpa* var. *insularis* Nakai, but Shin and Kim cited one (Nakai 4167) of these two syntypes as a holotype, not a lectotype, simply because of a stamp on Nakai 4166 specimens was found for this taxon at TI. These inaccurate and erroneous practices have hindered attainment of a satisfactory type concept.

Synonyms, which are validly and effectively published names, are two or more names that are applied to the same taxon (McNeill *et al.*, 2006). Among synonyms, the one which is the earliest, as per the principle of priority, is the correct name. Some Korean taxonomists have used the term an 'invalid name' equivalent to a synonym. This misconception always causes confusion as these terms have been applied to type concept.

The code indicates that a name validly published by reference to a previously and effectively published description or diagnosis is to be typified by an element selected from the context of the validating description or diagnosis (McNeill *et al.*, 2006). Since these names were published without designation of type and/or Latin description, types did not exist at all. In particular, recommendation 34A.1 of the code indicates that authors should avoid mentioning in their publications previously unpublished names that they do not accept, especially if the persons responsible for these unpublished names have not formally authorized their publication. Shin and Kim (2007) mentioned a lectotype based on an invalid name, *Allium victorialis* f. *variegatum* Nakai (Nakai, 1919), ignoring the code.

Acer okamotoi Nakai was nomenclaturally superfluous

and was to be rejected because Nakai (1915a) described this taxon and designated a type based on two different taxa, *A. okamotoanum* Nakai and *A. takesimense* Nakai. Later, Nakai (1918a) recognized this problem and described *A. takesimense* using a correct type. Shin and Kim (2007) indicated, however, that taxonomic status of *A. okamotoi* needs to be reconsidered for a lectotypification.

Article 9.4 (McNeill *et al.*, 2006) indicates that a syntype is any specimen cited in the protologue when there is no holotype, or any one of two or more specimens simultaneously designated as types. In the case of *Campanula takesimana* Nakai, *Sedum takesimense* Nakai, and *Fagus multinervis* Nakai, Nakai simply described these taxa in Japanese in his report (Nakai, 1919) or in Latin in the journal without any indication of types, but Shin and Kim (2007) applied the term 'syntype' to these taxa erroneously. Additionally, Nakai listed several specimens as types of *Aster oharai* Nakai (1918a), *Ligustrum foliosum* Nakai (1918c) and *Phellodendron insulare* Nakai (1918a), but Shin and Kim (2007) mentioned some selected specimens only as syntypes, simply because they were not able to find other specimens besides their examined specimens. Valid publication of names with types should be clear from the protologue and not dependent on subjective factors or information only available elsewhere (McNeill *et al.*, 2006).

Literature review and synonyms are imperative and essential elements of taxonomic study and aid in clarifying the taxonomic problems within any taxonomic group. Unfortunately, at present author citations tend to be copied from one publication to another without checking the original publication at all. That is, some taxonomists [*Lilium distichum* Nakai ex K. Kamibayashi in 1916, not 1915 with an incorrect author name, Nakai, 1917 (Lee, 2007); *Distylium racemosum* Siebold & Zucc. Flora Japonica 1: 179, 1841, not 1: 178, 1835 (Chang and Kim, 2007a); *Torreya nucifera* (L.) Siebold & Zucc. Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4: 232, not 4: 231 (Sun, 2007); *Cercidiphyllum japonicum* Siebold & Zucc. ex J.J. Hoffm. and J.H. Schult. bis, not Siebold & Zucc. (Chang and Kim, 2007b)] have perpetuated incorrect citations because they depended on limited references such as IPNI (the International Plant Names Index), Flora of China, and Flora of Japan and have never consulted original literature. As a consequence, the status of names changes from correct to synonyms or vice versa, and new incorrect names may also appear in many articles.

4. Misapplication of names

Article 52.1 indicates that a name is illegitimate and is to be rejected if it was nomenclaturally superfluous

when published. *Cinnamomum japonicum* Siebold [Verh. Batav. Genootsch. Kunsten. 12:23 (1830, not seen)] are superfluous names because the type is identical with *Laurus pendunculata* Thunb. (Ohba, 2006). *C. japonicum* Siebold in The Genera of Vascular Plants of Korea (Chung, 2007) should be corrected to *C. yabunikkei* H. Ohba (Ohba, 2006). *Malus sieboldii* (Regel) Rehder in Sarg. (Lee, 2007b) is also an illegitimate name, because the basionym, *Pyrus sieboldii* Regel, is a superfluous name because Regel cited *Sorbus toringo* Siebold as a synonym (Hara, 1978). Therefore, the correct name is *Malus toringo* (Siebold) Siebold ex Vriese.

Malus komarovii (Sarg.) Rehder was recognized as genus *Crataegus* L. once due to the resemblance of the leaves in the absence of mature fruit (Rehder, 1920). Lee (2007b) still used the old name, *Crataegus komarovii* Sarg., but it needs to be changed to *Malus komrovii*.

Conclusion

We feel that involvement of 'taxonomists' in the future is indispensable in flora work to avoid undesired confusion in the nomenclature. It is strongly recommended that scientists who have previously published careless work should be more cautious, and they should be instructed to read the original descriptions and to learn current practices in the code.

To conclude our article, we would like to cite Rao's comment here: "The ignorance or careless attitude to nomenclature issues by taxonomists themselves does more harm to the subject than non-taxonomists can cause" (Rao, 2004).

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