

Neo- and epitypification of *Arundinaria nitida* (Poaceae: Bambusoideae)

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Abstract A neotype and an epitype from the widely cultivated Fountain Bamboo are proposed for *Arundinaria nitida*. Application and authorship of the name are discussed, in the light of confusion over the validity of this name in different publications, and the implications of selecting different types for the application of generic names.

Keywords *Arundinaria*; China; epitype; *Fargesia*; neotype; *Sinarundinaria*; typification

■ INTRODUCTION

Seed of a temperate bamboo was collected in Gansu Province of W China in 1886, and small plants obtained by the Royal Botanic Gardens, Kew in June 1892. The species was destined to become one of the most widely cultivated ornamental clump-forming bamboos, known as the Fountain Bamboo. It was identified at Kew as *Arundinaria khasiana* Munro, another species with dark culms, from the Khasia Hills of India, known from herbarium collections to have been in cultivation at Kew in 1877. The Fountain Bamboo was briefly described under the name *A. khasiana* in a review of hardy bamboos in cultivation in Europe by Kew horticulturalist William Bean (1894). Greatly impressed with these new plants growing at Kew, Algernon Freeman-Mitford, a British diplomat with Oriental experience, having discovered their true origin from China rather than India, decided that they represented a new species, and in a lecture in London he used the new name, *Arundinaria nitida*. The lecture was not published until the following year (Mitford, 1896). Meanwhile, the name was used without a description, by an anonymous editor (1895: 186) reporting on Mitford's lecture, including a photograph (fig. 33) of a clump of Fountain Bamboo growing at Kew, and referring to the earlier, brief description of *A. khasiana* in cultivation by Bean (1894).

Kew taxonomist Otto Stapf described *Arundinaria nitida* in much greater detail (1896), citing the anonymous publication (1895) as “nomen solum”. There has been a strong tradition to attribute Stapf with authorship of *A. nitida*, and to discount publication in the rather ambiguous, anonymous editorial, and the equally ambiguous description of the cultivated specimens of “*A. khasiana*” by Bean (1894). Stapf (1896) cited two syntypes. One was from a plant grown in St Petersburg from the same seed collection as the Fountain Bamboo at Kew. The other, belonging to a different species from a different province, Hubei, was erroneously included by Stapf (1896), probably because the Fountain Bamboo syntype was sterile.

“*Arundinaria nitida* Stapf” was formally lectotypified (Stapleton, 1995), in order to maintain application of the name to the cultivated Fountain Bamboo, rather than to the species from Hubei. McClure (1940) had already separated out the Hubei syntype as a distinct new species, *Indocalamus confusus* McClure, and annotated the remaining syntype as lectotype, but he did not explicitly publish the lectotypification. This implicit lectotypification was duly formalised (Stapleton, 1995), which is in accordance with Rec. 9A.4 of the *Melbourne Code* (McNeill & al., 2012).

■ RELATED SPECIES

Application of the name *Arundinaria nitida* had become important for the application of three generic names for two groups of temperate bamboos, which vary in compression of inflorescences, and in rhizome form, which determines whether they grow in clumps or spread. Franchet (1893) had previously described *Fargesia* Franch. from a Chinese flowering specimen of *F. spathacea* Franch., which has compressed spathed inflorescences. Nakai (1935) in Japan, having received plants of two Chinese species from Kew, Fountain Bamboo, *A. nitida*, and the similar Umbrella Bamboo, *A. murielae* Gamble, described *Sinarundinaria* Nakai solely for the sterile plants of *A. nitida* and *A. murielae* that he had received. The three species *F. spathacea*, *A. nitida* and *A. murielae* are all clump-forming with relatively short rhizomes.

Keng (1957) described a further genus, *Yushania* Keng f. for spreading species with long-necked pachymorph rhizomes and open unspathed inflorescences, with a type from Taiwan.

As reported by Stapleton (1995), application of these generic names in mainland China became controversial in the 1980s. Although originally Chinese plants, *F. spathacea*, Fountain Bamboo and Umbrella Bamboo were not well known in China. Nakai (1935) had erroneously attributed them and his

new genus *Sinarundinaria* with having long rhizomes, which caused confusion in China.

Chao & al. (1981) reported finding a Chinese species in the wild that they identified as *Arundinaria nitida*. Because the species they found has long-necked pachymorph rhizomes, they decided to reduce *Yushania* to a synonym of *Sinarundinaria*. In their opinion *Arundinaria nitida* was a spreading, not clump-forming bamboo, with long-necked pachymorph rhizomes, which they called *Sinarundinaria nitida*. Climatic differences were postulated as explaining its clump-forming habit in western cultivation. This was followed by several authorities, including Clayton & Renvoize (1986) and Chao & Renvoize (1989).

However, other taxonomists in China included *Arundinaria nitida* in the purely clump-forming genus *Fargesia* as *F. nitida* (Mitford ex Anon.) Keng f. ex T.P.Yi. They recognized *Yushania* as the correct name for the genus of bamboos with long-necked pachymorph rhizomes and open, unspathed inflorescences. *Sinarundinaria* was considered by them to be a synonym of *Fargesia* (Wang & Ye, 1980). The Stapf syntype of *A. nitida* erroneously included by him (1896) and separated by McClure as *Indocalamus confusus* was transferred as *Yushania confusa* (McClure) Z.P.Wang & G.H.Ye. The bamboo genera were revised accordingly (Keng, 1982, 1983), and a very large number of new Chinese species were described. The clump-forming species were placed in *Fargesia*, and spreading species with long-necked pachymorph rhizomes were described in *Yushania*.

Whether *Yushania* or *Sinarundinaria* should be used for the bamboos with open inflorescences and long-necked pachymorph rhizomes could only really be settled by the flowering of the cultivated Fountain Bamboo, revealing whether it had compressed inflorescences, as the earlier *Fargesia*, or open inflorescences, as the later *Yushania*.

The flowering of Umbrella Bamboo *Arundinaria murielae* (Soderstrom, 1979a) had revealed compressed inflorescences, and several authors had consequently placed that species in *Fargesia* (or *Thamnocalamus* s.l.) (Soderstrom, 1979b; Yi, 1983). Stapleton (1991) examined branching patterns in *A. nitida* and *Fargesia murielae*. From close similarities it was concluded that the inflorescences were also likely to be similar, i.e., compressed, noting that similar flowers had also recently been collected in China and identified as *A. nitida*.

This uncertainty was settled when compressed inflorescences that were undisputedly from the Fountain Bamboo were first found in the U.K., and *Arundinaria nitida* was consequently lectotypified by Stapf's syntype from the Fountain Bamboo (Stapleton, 1995), to keep *Arundinaria nitida* and consequently *Sinarundinaria* within *Fargesia*.

Li (1996) considered what would be necessary to follow the alternative approach, in order to allow *Sinarundinaria* to take priority over *Yushania* Keng f., as applied in, for example, Clayton & Renvoize (1986), Hsueh & Li (1987) and Chao & Renvoize (1989). He proposed the conservation of the name *Sinarundinaria* Nakai, with Stapf's syntype from *Yushania confusa* conserved as type of *S. nitida* (Mitford ex Anon.) Nakai. This was duly considered but not felt appropriate and

the proposal was rejected, largely because so very many species had been described in the genus *Yushania*. About 55 would require new combinations in *Sinarundinaria* if conserved. In addition the widely cultivated Fountain Bamboo would have required a new name. Moreover Nakai was clearly describing *Sinarundinaria* for the cultivated plants of Fountain and Umbrella Bamboo sent by Kew.

In the conservation proposal Li (1996) had pointed out that publication of *Arundinaria nitida* in the anonymous editorial (1895) was technically valid, on the basis of its reference to the earlier description of *A. khasiana* by Bean (1894). Brummitt (1998) confirmed this and stated the name should be cited as *A. nitida* Mitford. Although the name was indeed attributed to Mitford, the validating description was attributed to Bean (1894), and under Art. 46.5 of the *Melbourne Code* (McNeill & al., 2012), the authorship of *A. nitida* should actually in this case be cited as “Mitford ex Anon.”, or just “Anon.” No external evidence has been found to identify who exactly the author of this particular editorial article was. This example is unusual not only because the author of the botanical name is anonymous, but also because authorship is attributed to someone who provided neither the name (this being provided by Mitford) nor the description (this being provided by Bean). Nevertheless it would appear that “Anonymous” must be taken as the publishing author because he/she was the first to link the name and the description together (Art. 46.3 Note 3; McNeill & al., 2012).

In this way the place of valid publication of *Arundinaria nitida* is Anonymous (1895) not Stapf (1896). Unfortunately, subsequent closer inspection of Anonymous (1895) has revealed that this author misunderstood and misquoted Mitford's lecture. While in the early part Mitford (1896) made it clear that he was referring his new name solely to the plants at Kew misidentified as *A. khasiana*, the anonymous author (1895) reported only on Mitford's concluding remarks, from which he appears to have gained the impression that Mitford was referring to the entire species *A. khasiana*:

“*Arundinaria nitida*, fig. 33, one of the loveliest and hardiest, to quote Mr. MITFORD, was formerly called *A. khasiana*, under the erroneous impression that it was a native of the Khasya mountains, ... The species, it appears, is really a native of the Chinese Province of Szchuen ...”

It looks as though the anonymous author presented *Arundinaria nitida* as a substitute name for *A. khasiana* Munro, rather than as a new species as Mitford had intended, in which case it would be an illegitimate superfluous name and indeed it has been listed as such in several publications (Ohrnberger, 1988, 1999; Sorong, 2000: 22) and (as of March 2014) in online resources (Farr & Zijlstra, 2014: *Sinarundinaria*; Tropicos, 2014: *Arundinaria nitida*).

If *Arundinaria nitida* Mitford were to be an illegitimate superfluous name for *A. khasiana*, then the later 1896 publications of *A. nitida* for the Fountain Bamboo would be illegitimate later homonyms. A new name would therefore be required for the Fountain Bamboo. Another undesirable consequence of this would be that *A. nitida* Mitford ex Anon., and consequently *Sinarundinaria*, would be typified by the type of *A. khasiana*, from Meghalaya, India. *Arundinaria khasiana* is well known

and there is no doubt that it is referable to the well-recognized genus *Drepanostachyum* Keng f., over which the now little-used name *Sinarundinaria* would take priority.

Several *Drepanostachyum* species, including *D. khasianum*, have actually been transferred to *Sinarundinaria* in the past (Chao & Renvoize, 1989), but that was the result of the assumption that *A. nitida* has open paniculate inflorescences, coupled with a very broad and polyphyletic generic concept for *Sinarundinaria* that included species of *Drepanostachyum*, *Yushania* and several other genera besides. *Sinarundinaria* has now settled as a synonym of *Fargesia*, and the Fountain Bamboo is almost universally accepted as *Fargesia nitida* (Li & al., 2006). The typification proposed here aims to stabilise that usage of the names.

■ TOWARDS A SOLUTION

To legitimise *Arundinaria nitida* it was at first felt necessary to propose conservation of the name with material of the Fountain Bamboo cultivated at Kew as conserved type. This would certainly have legitimised and typified it, and removed any association with *A. khasiana* Munro. However, this is no longer considered necessary, because it has been realised that the anonymous author of *A. nitida* implicitly excluded all the syntypes of *A. khasiana* Munro, by stating that the new species came from Sichuan in China, and not from the Khasia Mountains of India. Therefore, under Art. 52.2 of the *Melbourne Code* (McNeill & al., 2012), *A. nitida* Mitford ex Anon. is not a superfluous, illegitimate name.

Fig. 1. Clump of *Arundinaria nitida* in the Bamboo Garden at Kew in 1999, just starting to flower, in a site appearing the same as that in Anonymous (1895: fig. 33; <http://biodiversitylibrary.org/page/32986466>).



Type material for *Arundinaria nitida* Mitford ex Anon. clearly should be from the Fountain Bamboo grown at Kew, as this was the basis for Mitford's name, the protologue, and the validating description by Bean (1894). A sterile collection preserved at K in March 1895 is designated below as neotype. The protologue included a photograph (Anonymous, 1895: fig. 33; <http://biodiversitylibrary.org/page/32986466>) of a clump of *Arundinaria nitida* growing in the Bamboo Garden at Kew. A site there, with a clump of *Fargesia nitida* in front of an ancient, slanting oak, appearing very similar in 1999, is shown in Fig. 1. The clump started to flower that year, and died in 2001, 115 years after collection of the seed. *Fargesia nitida* had started to flower in the U.K. in 1993 (Stapleton, 1995), and all plants around the world derived from the initial seed collection in China are thought to have flowered and died. Fertile material, with compressed inflorescences, was collected from the clump to serve as epitype (<http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000872530>) to support the sterile neotype (<http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000872536>), which may well have come from the same plant 105 years earlier.

■ TYPIIFICATION

Arundinaria nitida Mitford ex Anon. in Gard. Chron. 18: 186. 17 Aug 1895 ≡ *Sinarundinaria nitida* (Mitford ex Anon.) Nakai in J. Jap. Bot. 11(1): 1. 1935 ≡ *Fargesia nitida* (Mitford ex Anon.) Keng f. ex T.P.Yi in J. Bamboo Res. 4(2): 30. 1985 ≡ *Thamnocalamus nitidus* (Mitford ex Anon.) Demoly in

Bambou Bull. Liais. A. E. B. 9: 13. 1991 – **Neotype (designated here)**: RBG Kew (cult.), 19 Mar 1895, *s.n.* (K!) – **Epitype (designated here)**: RBG Kew (cult.), 17 Mar 2000, *Stapleton 1139* (K!).

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