

Chimonocalamus baviensis, a new combination in Vietnamese Bambusoideae (Poaceae)

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Arundinaria baviensis Balansa was found to have short-necked pachymorph rhizomes and culms with nodal rings of root thorns, especially dense at lower nodes. This is in accordance with the characteristics of *Chimonocalamus*, and therefore a new combination, *Chimonocalamus baviensis* (Balansa) N.H. Xia, V.L. Le & Y.F. Deng, is proposed.

Key words: *Arundinaria*, Bambusoideae, *Chimonocalamus*, nomenclature, Poaceae

The genus *Arundinaria* was established by Michaux (1803), typified by *A. macrosperma* Michx., which is a later synonym of *A. gigantea* (Walt.) Muhl., for a group of bamboos characterized by leptomorph rhizomes and three stamens (Chao & Renvoize 1989, Stapleton 1994). All species with three stamens were placed in *Arundinaria* until late in the 19th century, when Munro (1868) and Franchet (1893) published the new genera *Thamnocalamus* and *Fargesia* respectively. Since 1803, more than 400 binomial names were placed under *Arundinaria* including American, Asian and African species, which however constitute a taxonomically heterogeneous group of bamboos. Since then, there has been much disagreement over the classification of the *Arundinaria s. lato* group (Chao & Chu 1979, Keng 1982, Clayton & Renvoize 1986, Yang & Chao 1993, Chao & Tang 1993, Keng 1996, Li 1997). The genus *Arundinaria* has been

interpreted by different authors in various ways and the delimitation of the genus is controversial. Many botanists have recognized that certain species, originally published in *Arundinaria*, differ in various ways and have published new genera to accommodate them, e.g., *Chimonobambusa* (Makino 1914), *Sinobambusa* (Makino 1918), *Indocalamus*, *Pleioblastus* and *Pseudosasa* (Nakai 1925), *Sinarundinaria* (Nakai 1935), *Brachystachyum* and *Oreocalamus* (Keng 1940), *Yushania* (Keng 1957), *Ampelocalamus* (Chen *et al.* 1981), *Oligostachyum* (Wang & Ye 1982), *Bashania* (Keng & Yi 1982), *Drepanostachyum* and *Himalayacalamus* (Keng 1983), *Vietnamosasa* (Nguyen 1990), *Borinda* (Stapleton 1994) and *Sarocalamus* (Stapleton 2004).

The bamboos in Vietnam have been studied taxonomically by several authors (Balansa 1890, Camus 1913, Camus & Camus 1923, Camus 1927, 1952, Chao & Renvoize 1989,

Nguyen 1990, Ho 2000, Nghia 2006). Balansa (1890) described two species of *Arundinaria* from Tonkin (N Vietnam), *A. sat* which was transferred to *Semiarundinaria* (Nakai 1925), *Sinobambusa* (Chao & Renvoize 1989, Nguyen 1991) and *Indosasa* (Nguyen 1990), and *A. baviensis*. Camus and Camus (1923) recorded three species of *Arundinaria* from Tonkin, i.e. *A. baviensis*, *A. sat*, and *A. pusilla*, which was transferred to *Oreiostachys* by Nakai (1925), *Racemobambos* (Chao & Renvoize 1989) and *Vietnamosasa* (Nguyen 1990). Camus (1927) recorded *A. brilletii* from Yen-lap, Tonkin, which was transferred to *Acidosasa* by Chao and Renvoize (1989). Camus (1952) published a further two species of *Arundinaria*, *A. petelotii* from Tonkin, transferred to *Sinarundinaria* by Nguyen (1990) and *A. schmidiana* from Annam, transferred to *Sinarundinaria* by Chao and Renvoize (1989; Nguyen 1990), *Yushania* (Ohrnberger 1996) and *Borinda* (Stapleton 1998). Ho (2000) recognized five species of *Arundinaria*, i.e. *A. baviensis*, *A. petelotii*, *A. pusilla*, *A. rovelii* and *A. amabilis* from Vietnam. Among the five species, only *A. amabilis* is acceptable in *Arundinaria s. lato*. The identification and generic placement of *A. rovelii* is still questionable because it was established based on vegetative material cultivated in Europe. Nghia (2006) recorded eight unnamed species of *Arundinaria* from Vietnam. Without flowering material, the generic placement of the unnamed *Arundinaria* species is still uncertain.

Arundinaria baviensis was described by Balansa (1890) based on the collection *Balansa 1586* from Mount Bavi, N Vietnam, and well illustrated by Camus (1913), but without any rhizome information. In September 2004, an expedition to Mount Bavi was undertaken and on the top of the mountain we collected a flowering bamboo. The specimen matched the descriptions and illustrations of *A. baviensis* (Balansa 1890, Camus 1913) by having a pedicellate and linear spikelet, 5–6-florets, with the terminal floret sterile, two glumes, a 2-keeled palea, and two stigmas. Its rhizomes were short-necked pachymorph and the culms had a ring of root thorns, especially dense at lower nodes. Nakai (1925) transferred the species to his new genus *Chimonobambusa* as *C. baviensis* (Balansa) Nakai because of the culm

characters, but the pachymorph rhizomes of *A. baviensis* make this placement inappropriate. It was later transferred to *Pleioblastus* by Nguyen (1990), although that genus also has leptomorph rhizomes, and into *Yushania* by Ohrnberger (1996), although that genus has no culm thorns. Ho (2000) considered it should remain in *Arundinaria*, but that genus has leptomorph rhizomes and no nodal root thorns.

Only *Chimonocalamus* combines root thorns with pachymorph rhizomes, and therefore a new combination is necessary. *Chimonocalamus* was established by Hsueh and Yi (1979), typified by *C. delicatus* from Yunnan Province of China. It is a small genus now consisting of twelve species including *C. baviensis*, found from Meghalaya in NE India, through Myanmar and the Chinese Province of Yunnan to N Vietnam (Hsueh & Yi 1996, Ohrnberger 1999, Li & Stapleton 2006). The genus has been considered congeneric with *Sinarundinaria* by some authors (Clayton & Renvoize 1986, Chao 1989, Chao & Renvoize 1989, Brummitt 1992, Chao & Tang 1993). Chao and Renvoize (1989) regarded it as a section of *Sinarundinaria*. However, *Chimonocalamus* is clearly distinguished from *Sinarundinaria* by its lower culm nodes with root thorns, and its open inflorescence with more paniculate branching.

***Chimonocalamus baviensis* (Balansa)**

N.H. Xia, V.L. Le & Y.F. Deng, *comb. nova*

Arundinaria baviensis Balansa, J. Bot. Appl. (Desvaux) 4: 27. 1890. — *Chimonobambusa baviensis* (Balansa) Nakai, J. Arnold Arbor. 6: 151. 1925. — *Pleioblastus baviensis* (Balansa) T. Q. Nguyen, Bot. Zhurn. 75(2): 225. 1990. — *Yushania baviensis* (Balansa) J. J. N. Campb. ex Ohrnb., Bamboos of the World Intro. 3: 14. 1996. — TYPE: Vietnam. [Tonkin] Hatay Province, Mt. Bavi, *Balansa 1586* (holotype P, not seen).

DISTRIBUTION. Endemic to Bavi District, Hatay Province, North Vietnam. It grows in broad-leaved and coniferous mixed forest at 1000–1300 m.

ADDITIONAL SPECIMENS EXAMINED. — Vietnam. Hatay: Bavi District, Mount Bavi, alt. 1000–1300 m, 8.IX.2004 *Xia Nian-He et al. s.n.* (FSIV); same locality, 7.I.2007 *Le Viet Lam 531* (FSIV, IBSC).

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References

- Balansa, B. 1890: Catalogue des Graminées de l'Indo-chine Française: Bambusées. — *J. Bot. Appl. (Desvaux)* 4: 27–32, 161.
- Brummitt, R. K. 1992: *Vascular plant families and genera*. — Royal Bot. Gardens, Kew.
- Camus, A. 1927: Un Bambou nouveau du Tonkin. — *Bull. Soc. Bot. France*, ser. 5, 3: 620–622.
- Camus, A. 1952: Contributions a la flore de l'asie orientale. — *Notulae Syst.* 14: 252–258.
- Camus, E. G. 1913: *Les Bambusées: monographie, biologie, culture, principaux usages*. — Paul Lechevalier, Paris.
- Camus, E. G. & Camus, A. 1923: *Gramineae*. — In: Lecomte, H. (ed.), *Flore générale de l'Indo-chine*, 7: 203–650. Masson et Cie, Paris.
- Chao, C. S. & Chu, C. D. 1979: *Arundinaria* Michaux and its distribution in China. — *J. Nanjing Technol. Coll. Forest Prod.* 1980(3): 22–27.
- Chao, C. S. & Renvoize, S. A. 1989: A revision of the species described under *Arundinaria* (Gramineae) in Southeast Asian and Africa. — *Kew Bull.* 44: 349–367.
- Chao, C. S. & Tang, G. G. 1993: The present status and problems of bamboo classification in China. — *J. Nanjing Forestry Univ.* 17(4): 1–8.
- Chao, C. S. 1989: *A guide to bamboo grown in Britain*. — Royal Bot. Gardens, Kew.
- Chen, S. L., Wen, T. H. & Sheng, G. Y. 1981: *Ampelocalamus* — a new genus of Chinese bamboo. — *Acta Phytotax. Sin.* 19: 332–334.
- Clayton, W. D. & Renvoize, S. A. 1986: *Genera Graminum*. — HMSO, London.
- Franchet, A. 1893: *Fargesia*, nouveau genre de Bambusées de la Chine. — *Bull. Mens. Soc. Linn. Paris* 2: 1067–1069.
- Ho, P. H. 2000: *Cay co Viet Nam — an illustrated flora of Vietnam*, 3: 560–627. — Nha Xuat Ban Tre, Hochi Minh City.
- Hsueh, C. J. & Yi, T. P. 1979: Two new genera of Bambusoideae from S. W. China. — *Acta Bot. Yunnanica* 1(2): 75–76.
- Hsueh, C. J., Yi, T. P. & Li, D. Z. 1996: Validation of *Qiongzhuca* and correlated species names (Gramineae, Bambusoideae). — *Taxon* 45: 217–221.
- Keng, B. J. & Wang, Z. P. (eds.) 1996: Gramineae Bambusoideae. — In: *Flora Republicae Popularis Sinicae* 9(1): 1–750. Sci. Press, Beijing.
- Keng, P. C. 1957: One new genus and two new species of Chinese bamboos. — *Acta Phytotax. Sin.* 6: 355–360.
- Keng, P. C. 1982: A revision of genera of bamboos from the world, I. — *J. Bamboo Res.* 1(1): 1–19.
- Keng, P. C. 1983: A revision of genera of bamboos from the world, III. — *J. Bamboo Res.* 2(1): 11–27.
- Keng, Y. L. 1940: Two new generic names and one new species of Chinese bamboos. — *Sunyatsenia* 4: 146–153.
- Li, D. Z. 1997: The Flora of China Bambusoideae Project — problems and current understanding of bamboo taxonomy in China. — In: Chapman, G. P. (ed.), *The bamboos*: 61–81. Acad. Press, California.
- Li, D. Z. & Stapleton, C. 2006: *Chimnocalamus*. In: Wu, Z. Y., Revan, P. H. & Hong, D. Y. (eds.), *Flora of China*, 22: 103–105. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis.
- Makino, T. 1914: Observations on the flora of Japan. — *Bot. Mag., Tokyo* 28(329): 153
- Makino, T. 1918: A contribution to the knowledge of the flora of Japan. — *J. Jap. Bot.* 2: 8.
- Michaux, A. 1803: *Flora boreali-americana*, sistens caracteres plantarum quas in America Septentrionali collegit et detexit 1: 73–74. — Parisiis et Argentorati: apud fratres Levrault, Strasbourg.
- Munro, C. 1868: A monograph of Bambusaceae. — *Trans. Linn. Soc. London* 26: 1–157.
- Nakai, T. 1925: Two new genera of Bambusaceae, with special remarks on the related genera growing in eastern Asia. — *J. Arnold Arbor.* 5: 145–153.
- Nakai, T. 1935: Novitates Bambusacearum in Imperio Japonico recentissime detectae (III). — *Jap. J. Bot.* 11: 1–2.
- Nguyen, H. N. 2006: *Bamboos of Vietnam*. — Agric. Publ. House, Hanoi.
- Nguyen, T. G. 1990: New taxa of Bamboos (Poaceae, Bambusoideae) from Vietnam. — *Bot. Zh.* 75(2): 221–225.
- Nguyen, T. G. 1991: A new genus and the new species of bamboos (Poaceae, Bambusoideae) from Vietnam. — *Bot. Zh.* 76(6): 874–880.
- Ohrnberger, D. 1996: *The bamboos of the world: introduction to the work*, 2. — Elsevier, Berlin.
- Ohrnberger, D. 1999: *The bamboos of the world — annotated nomenclature and literature of the species and the higher and lower taxa*. — Elsevier, Berlin.
- Stapleton, C. M. A. 1994: The bamboos of Nepal and Bhutan, part II: *Arundinaria*, *Thamnocalamus*, *Borinda*, and *Yushania* (Gramineae: Poaceae, Bambusoideae). — *Edinb. J. Bot.* 51: 275–295.
- Stapleton, C. M. A. 1998: New combination in *Borinda* (Gramineae–Bambusoideae). — *Kew Bull.* 53: 453–459.
- Stapleton, C. M. A., Chonghaile G. N. & Hodkinson, T. R. 2004: *Sarocalamus*, a new Sino-Himalayan bamboo genus (Poaceae: Bambusoideae). — *Novon* 14: 345–349.
- Wang, Z. P. & Ye, G. H. 1982: *Oligostachyum*, a new genus of Chinese Bambusoideae. — *J. Nanjing Univ. (Nat. Sci.)* 1982(1): 95–99.
- Yang, G. Y. & Chao, C. S. 1993: A revision of the genus *Arundinaria* Michaux in China I. — *J. Bamboo Res.* 12(4): 1–6.