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A new combination in *Pseudosasa* and a revised description of *Indosasa hispida* (Poaceae, Bambusoideae)

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A new combination *Pseudosasa nanningensis* (Q.H. Dai) D.Z. Li & Y.X. Zhang is made, based on new collections with inflorescences from Guangxi, China. Additions are also made to the description of *Indosasa hispida* McClure, which is included in the key to species of *Indosasa* from the bamboo account of the *Flora of China*, following more comprehensive collections.

The account of the Bambusoideae in the *Flora of China* has been published as a joint international effort (Li *et al*. 2006). However, problems and uncertainties still remain because of intrinsic difficulties in bamboo taxonomy. Historically, bamboo classification was primarily based on reproductive characters, although inflorescences of many bamboos are unknown as a result of their long life cycles and scarcity of flowering collections. More recently, vegetative components, such as culm sheaths and branching, have been collected and appreciated more widely for their identification and classification (Soderstrom & Young 1983, Stapleton 1994, Li 1997). As a substantial proportion of bamboo species were initially described from incomplete collections, there will be an ongoing need to re-collect Chinese bamboos in order to refine and improve our knowledge of them.

A new combination in *Pseudosasa*

Arundinaria nanningensis Q.H. Dai was originally described without inflorescences (Dai 1987). In the *Flora of China* (Li *et al*. 2006), it is treated as a synonym of *Sinobambusa intermedia*. We encountered flowering clumps of *Arundinaria nanningensis* in the type locality in Nanning, Guangxi in April 2007, and this made it possible for us to assess its identity and generic placement properly and to describe its inflorescence for the first time. The spikelets we found were pedicellate, while those of *Sinobambusa intermedia* are sessile, so it clearly cannot be a synonym of that species. These two species are in fact readily distinguishable using the full range of characters (*see* Table 1).

Arundinaria nanningensis was originally described in *Arundinaria*, a north-temperate genus

that has been treated in broad and narrow senses. It is sometimes considered to include many Asian species, including several genera such as *Bashania*, *Oligostachyum*, *Pleioblastus* and *Pseudosasa* (Clayton & Renvoize 1986, Soderstrom & Ellis 1987, Yang & Zhao 1993, 1994, Li 1997). However, it can be inferred from recent molecular studies, including those of Triplett and Clark (2010) and Zeng *et al*. (2010), that *Arundinaria* should be treated in a strict sense, i.e. comprising only three species endemic to the eastern United States. In the bamboo account of *Flora of China* (Li *et al*. 2006), a compromise was reached with *Arundinaria* being treated in a somewhat broad sense, including *Bashania* and *Sarocalamus*, but not *Pseudosasa* or other genera. *Arundinaria nanningensis* is clearly neither a member of *Arundinaria*, nor of *Bashania* or *Sarocalamus*. This species should be transferred to the more substantially different genus, *Pseudosasa*, the diagnostic characters of which include: culm sheaths persistent to tardily deciduous, branches 1–3 per node or more at the upper nodes and basally appressed to culms, inflorescences with greatly reduced bracts, in open racemes or panicles of pedicellate spikelets, rachilla sinuous, disarticulating below florets, stigmas 3. Both the vegetative and reproductive features suggest that *Arundinaria nanningensis* is a member of *Pseudosasa*.

Pseudosasa nanningensis (Q.H. Dai) D.Z. Li & Y.X. Zhang, *comb. nova* (Fig. 1)

Arundinaria nanningensis Q.H. Dai, J. Bamboo Res. 6(3): 35. 1987. — Type: China. Guangxi, Nanning, Laohuling, 12.V.1983 *Q. H. Dai & C. F. Huang 8311* (holotype GXFI!). — *Sinobambusa intermedia auct. non* McClure: Li *et al*., Flora of China 22: 149. 2006.

Rhizomes leptomorph. Culms 2–3 m, 1–2 cm in diameter; internodes 20–40 cm, glabrous, with waxy powder under nodes, terete or slightly grooved above branches. Culm sheaths tardily deciduous, abaxial surfaces with pale brown setae, denser at base; auricles falcate, dark purple; oral setae radiate; ligules arched, 3 mm tall, fimbriate at top; blades ovate-lanceolate, reflexed, with white setae abaxially. Branches 3(5) per node, base appressed to culm. Leaves 3–5 per ultimate branch; sheaths glabrous, margins ciliolate; auricles falcate; oral setae radiate; ligules 1 mm; blades 12–18 × 1.5–2 cm, abaxial surfaces hairy at base, secondary veins 4–5-paired. Inflorescence a raceme with greatly reduced supporting bracts. Spikelets 3–5, mostly 4; pedicels 5–20 mm, adaxially pubescent at the base; rachilla internodes 5 mm, disarticulation below florets; florets 5–10. Glumes 3, margin ciliate, first small, 5–7 mm, 5–7-veined, the second and third lemma-shaped, 7–10 mm, 7–10-veined; lemmas ovate-lanceolate, with thin waxy powder, purple at top, sparsely setaceous abaxially, 8–10 mm long, apex acute, 8–12-veined; paleas with 2 ciliate keels, 7–9 mm; lodicules 3, unequal, margin ciliate; stamens 3, with anthers 5 mm long; ovary ovoid; stigmas 3, plumose, about 3 mm long. Caryopsis unknown. Shooting and flowering in April.

Additional collection: China. Guangxi: Nanning, Laohuling, near the reservoir, 2.IV.2007 *Y. X. Zhang et al. 07002* (KUN).

Table 1. Diagnostic morphological features of *Sinobambusa intermedia* and *Pseudosasa nanningensis*.

	S. intermedia	*P. nanningensis*
Culms	5 m tall, internodes 50–60 cm, initially pubescent	2–3 m tall, internodes 20–40 cm, glabrous
Culm sheaths	abaxial side with sparse, yellow-brown setae, denser toward base; auricles falcate; ligules arched, hirsute; blade glabrous	abaxial side with pale-brown setae, denser at base; auricles falcate, dark-purple; oral setae radiate; ligules arched, fimbriate at top; blade hispid abaxially
Branches	3(5–7) per node	3(5) per node
Leaves	3–5 per ultimate branchlet, 12–22 × 1.3–2.8 cm, abaxial leaf base hairy	3–5 per ultimate branchlet, 12–18 × 1.5–2 cm, abaxial leaf base hairy
Inflorescences	with bracts 2–4, spikelets sessile; lodicules 2 or 3; stamens 3, stigmas 2 or 3	no bracts, spikelets pedicellate; lodicules 3, unequal; stamens 3, stigmas 3

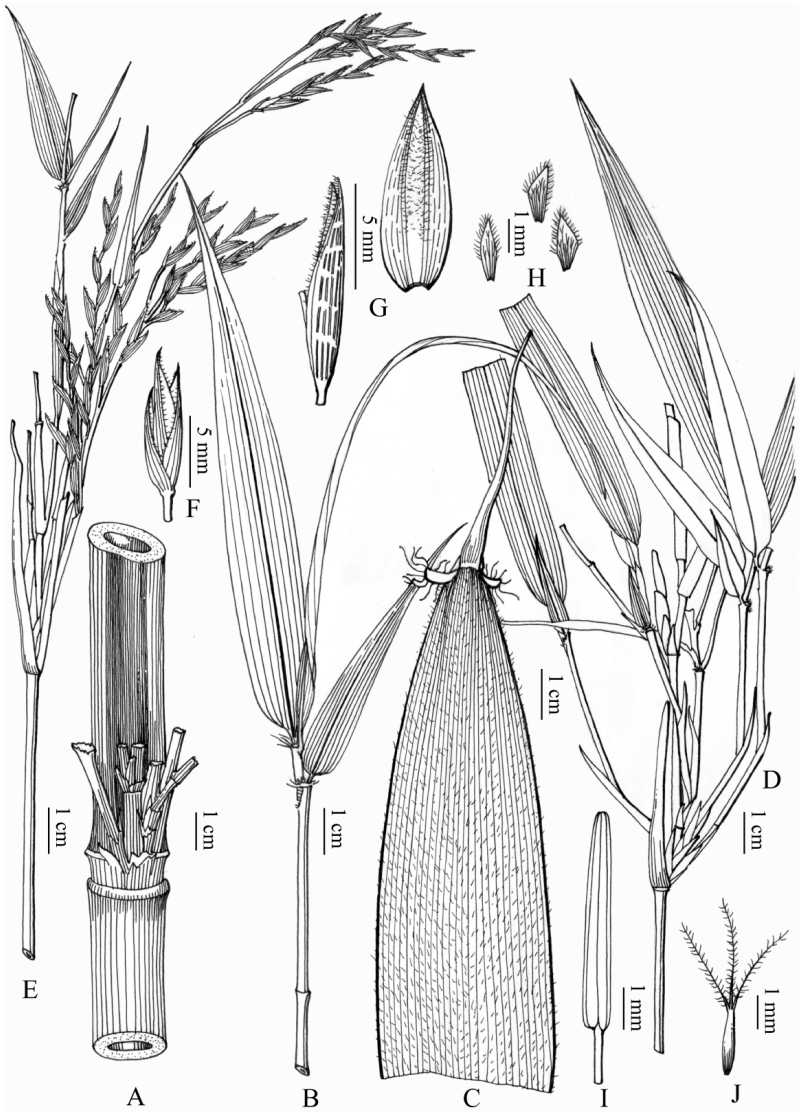

Fig. 1. *Pseudosasa nanningensis* (*Zhang et al. 07002*, KUN). — **A**: Portion of culm, showing branching pattern. — **B**: New shooting leaves. — **C**: Abaxial view of culm sheath. — **D**: Leafy branchlets. — **E**: Flowering branchlets. — **F**: Glumes and portion of rachilla. — **G**: Floret, rachilla internode and palea. — **H**: Lodicules. — **I**: Stamen. — **J**: Pistil. Drawn by Ling Wang.

There are 18 species of *Pseudosasa* in *Flora of China* (17 endemic, one introduced). Adding *Pseudosasa nanningensis* to this genus, a total of 19 species is now known for China. This genus is divided into two subgenera, subgenus *Pseudosasa* and subgenus *Sinicae*. The first subgenus, restricted to Japan, has persistent culm sheaths and 1–3 branches at midculms, while the latter has tardily deciduous culm sheaths and usually 3 branches at midculms. *Pseudosasa nanningensis* shares characters of the latter, and belongs to the subgenus *Sinicae*.

Pseudosasa nanningensis is known only from the type locality, growing on or adjacent to hill slopes. The main characters that distinguish it from other species of *Pseudosasa* are the falcate auricles of its culm sheaths with dark purple radiating oral setae, culm sheath blades with white setae on the abaxial surfaces, and three glumes.

Additional description of *Indosasa hispida*

McClure (1940) described *Indosasa hispida* based on material without culm sheaths. It is widely recognized and included in the bamboo

accounts of *Flora Reipublicae Popularis Sinicae* (Keng & Wang 1996), and *Flora of China* (Li *et al*. 2006). The key to species of *Indosasa* in both floras was based on vegetative characters, but as the culm sheaths of *I. hispida* were not available, this species could not be included. We explored the type locality (Nankunshan, Longmen, Guangdong, China) in 2008 and were fortunate in finding *Indosasa hispida* in flower again. Its identity was validated by characters of the inflorescence, culms and leaves, and the complete collections make it possible for us to describe the culm sheaths of the species for the first time, and to include this species in the key to *Indosasa* for the *Flora of China*.

Indosasa hispida McClure

Lingnan Univ. Sci. Bull. 9: 31. 1940.

Culm sheaths hard-papery, shorter than the internodes, deciduous, purple-green when fresh and pale brown when dry, abaxial side sparsely covered with pale-brown setae, in the upper part with scattered purple spots, longitudinal ribs prominent, margins densely ciliate; auricles and oral setae absent; ligules 1–2 mm tall, truncate, fimbriate at top; blades lanceolate, erect, purple when fresh with cilia at the base of the adaxial surface.

Voucher specimen: China. Guangdong: Longmen County, Nankunshan, 23°37´44.3´´N, 113°51´51.8´´E, alt. 484 m, 25.IV.2008, *Y. X. Zhang & Z. Xu 08026* (KUN).

The relevant section of the key to species of *Indosasa* (Li *et al*. 2006) can be revised as follows:

6. Culm nodes and branch nodes weakly prominent; leaf blade abaxially pubescent 7
6. Culm nodes and branch nodes strongly prominent; leaf blade usually glabrous 8
7. Culm sheaths green when fresh, without spots; oral setae 2–4 ..... *I. angustata*
7. Culm sheaths purple-green when fresh, with purple spots; oral setae absent ..... *I. hispida*
8. Culm internode cavity pith lamellate; internodes initially villous; culm sheaths sometimes with sparse oral setae ..... *I. glabrata*
8. Culm internode cavity pith spongy or granular, never lamellate; internodes initially setose; culm sheaths without oral setae 9
9. Culm internode pith spongy; leaf blade 10–17 × 2–2.5 cm ..... *I. spongiosa*
9. Culm internode pith slightly granular; leaf blade 14–27 × 2.5–4.5 cm ..... *I. ingens*

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