A study of the genus *Bonia* (*Gramineae* : *Bambusoideae*)

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Summary. *Monocladus* is reduced to a synonym of *Bonia* based on morphological evidence, and four new combinations, *Bonia saxatilis* (L. C. Chia, H. L. Fung & Y. L. Yang) N. H. Xia, *B. solida* (C. D. Chu & C. S. Chao) N. H. Xia, *B. levigata* (L. C. Chia, H. L. Fung & Y. L. Yang) N. H. Xia and *B. amplexicaulis* (L. C. Chia, H. L. Fung & Y. L. Yang) N. H. Xia are made. The genus *Bonia* is delimited and a key to species is provided.

Monocladus L. C. Chia, H. L. Fung & Y. L. Yang was described from material collected in South China (Chia *et al.* 1988). The genus is distinguished from *Bambusa* by the solitary branch at each culm node and is widely accepted by Chinese bamboo taxonomists (Lin 1993, Yi 1993, Zhu *et al.* 1994). Four similar species were included when the genus was originally described, *M. saxatilis* L. C. Chia, H. L. Fung & Y. L. Yang, *M. amplexicaulis* L. C. Chia, H. L. Fung & Y. L. Yang, *M. levigatus* L. C. Chia, H. L. Fung & Y. L. Yang and *M. solidus* (C. D. Chu & C. S. Chao) L. C. Chia, H. L. Fung & Y. L. Yang. All are endemic to South China.

A further species, *Monocladus parviflosculus* W. T. Lin, was added later (Lin 1993), but there is little in the description or illustrations of this species to associate it with *Monocladus*. According to the original description and illustration it has very narrow culm sheath blades and no glumes in the spikelets. More collections are required to decide its generic affinity. *Arundinaria megalothyrsa* Hand.-Mazz. was transferred to *Monocladus* (Yi 1993), but this species has an ebracteate semelauctant inflorescence, and should not even be placed in the same subtribe as *Monocladus*. It has been placed in the genus *Yushania* (Wen 1987). To accommodate this species, a new genus *Gaoligongshania* has been established (Li *et al.* 1995).

The little-known monotypic genus, *Bonia* Balansa was described from material collected by the French missionary Père Bon in Vietnam in 1883 (Balansa 1890). He distinguished it from other bamboos by the 1 cm long rachilla internode between the glumes and the first floret. Baillon (1894) transferred *Bonia tonkinensis* to *Bambusa*, and E. G. Camus later gave *Bonia* new status as a subgenus of *Bambusa* (1913). Clayton & Renvoize (1986) treated it as a synonym of *Bambusa*. McClure (1957) was the only authority to recognize the genus. He dissected an inflorescence of *Bonia tonkinensis* to substantiate the rachilla characteristic reported by Balansa. This feature is indeed remarkable, the rachilla internode below the first fertile lemma being longer than that of any *Bambusa* species, including *B. longispiculata* Brandis.

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A comparison of the holotype of *Bonia* with material from the type species of *Monocladus*, *M. Saxatilis*, shows strong similarities in inflorescence structure, both genera having distinctive elongation of the rachilla between the glumes and the first floret. They also both have culm sheaths with strongly cupped blades, and the limited material available would suggest that *Bonia tonkinensis* also has the solitary branches characteristic of *Monocladus*.

Combining the distinctive inflorescence of *Bonia* with the characteristic branching and culm sheath of *Monocladus*, this group of bamboos has a strong claim to separate generic status. As *Bonia* has priority over *Monocladus*, the latter should be considered a synonym, and all species of *Monocladus* except *M. megalothyrsus* and *M. parvifloscullus* should be transferred to *Bonia*.

From sterile material *Bonia* appears superficially similar to *Indocalamus*, because both share a single branch compliment and large leaf blades. However, *Bonia* is very different from *Indocalamus*, having a pachymorph form of rhizome and an iterauctant bracteate inflorescence. Because no fruit material was available, Chia *et al.* (1988) put their *Monocladus* in the tribe *Melocanneae* and considered it close to *Melocalamus*. *Bonia*, with its short style and caryopsis is more reasonably placed in the tribe *Bambuseae*. See Table 1 for a comparison of characters between *Bonia* and related genera.

With the exception of *Bonia levigata*, all species are adapted to the dry, alkaline conditions of limestone karst areas. They constitute a valuable resource for the revegetation of such degraded and difficult areas. Their fibre characteristics and the small size of their culms make them suitable for production of pulp for paper-making. In addition, their large leaves provide good animal fodder and they are also often used for making rain hats and shelters.

TABLE 1. The differences between *Bonia* and related genera.

Characters	*Bonia*	*Bambusa*	*Schizostachyum*	*Melocalamus*
habit	scrambling	usually erect	erect or climbing	climbing
branch number in mid-culm	single	many	many	many
floret number in spikelets	3 – 9	several to many	1 to several	2
palea	membranous, 2-keeled	chartaceous, 2-keeled	coriaceous, rolled	membranous, 2-keeled
fruit	dry	dry	dry	fleshy

Bonia *Balansa* in J. Bot. (Morot) 4: (1890). Type species: *Bonia tonkinensis* Balansa.

Bambusa subgen. *Bonia* (Balansa) E. G. Camus in Bambusées (1913).
Monocladus L. C. Chia, H. L. Fung & Y. L. Yang in Acta Phytotax. Sin. 26(3): 212 (1988).

Clump-forming scrambling bamboos; rhizome pachymorph, short-necked. Culms subsolid to solid; nodes slightly prominent; branch solitary, nearly as thick as the culm. Culm leaves persistent, sheath coriaceous, persistent; auricles large, subfalcate to broadly falcate; ligules short; blade erect. Leaf blades usually large, lanceolate to linear-lanceolate, truncate at base. Inflorescence iterauctant, fully bracteate, arising from the axil of persistent spathiform bracts, prophylls 2-keeled, gemmiferous, inserted at the point of branching, closely followed by 2 – 3 closely-spaced gemmiferous bracts. First fertile lemma separated from gemmiferous bracts by rachilla segment of up to 1 cm. Spikelets with 3 – 9 florets, uppermost one imperfect; rachilla disarticulating between florets, internodes of rachilla up to 1 cm long. Lemma subcoriaceous; palea of lowest floret subcoriaceous and slightly longer than lemma, palea of other florets membranous and much shorter than the lemma; lodicules 3, glabrous; stamens 6, filaments free; ovary glabrous, style very short, stigmas 3, feathery. Caryopsis cylindrical and glabrous.

DISTRIBUTION. Five species, South China and Vietnam.

KEY TO SPECIES

1. Outer surfaces of culm sheath hairy
   2. Ligules of both culm sheath and leaf sheath long-ciliate at the margin ..... **1. B. saxatilis.**
   2. Ligules of both culm sheath and leaf sheath glabrous
      3. Culm leaf-blade obliquely cordate and amplexicaul; lower surface of leaf-blade glaucous and pubescent; culm white-pruinose and sparsely brownish-strigose ..... **2. B. amplexicaulis**
      3. Culm leaf-blade nearly round and not amplexicaul; lower surface of leaf-blade pale green and glabrous; culm not white-pruinose and glabrous .. **3. B. levigata**
1. Outer surfaces of culm sheath glabrous
   4. Ligules of both culm sheath and leaf sheath ciliate at margin ... **4. B. solida**
   4. Ligules of both culm sheath and leaf sheath glabrous ..... **5. B. tonkinensis**

1. **Bonia saxatilis** (*L. C. Chia, H. L. Fung & Y. L. Yang*) *N. H. Xia* **comb. nov.**

Monocladus saxatilis L. C. Chia, H. L. Fung & Y. L. Yang in Acta Phytotax. Sin. 26(3): 213 (1988). Type: China, *Geobotany Exped. of South China Institute of Botany* 5533 (IBSC).

CHINA. Guangxi, Donglan, on limestone hill, 400 – 750 m, *Geobotany Exped. of South China Institute of Botany* 5533 (IBSC); *Nanzhu* 2741 (IBSC); Liuzhou, *Longtan Doule Exped*, 371 (IBK); Guangdong, Yangshan County, on limestone hill, *Nanzhu* 2408 (IBSC).

VERNACULAR NAME: dan zhi zhu (Chinese).

2. **Bonia solida** (*C. D. Chu & C. S. Chao*) *N. H. Xia* **comb. nov.**

Indocalamus solidus C. D. Chu & C. S. Chao in Acta Phytotax. Sin. 18(1): 26 (1980); Bamboo Res. 1981 (1): 9 (1981).
Monocladus solidus (C. D. Chu & C. S. Chao) L. C. Chia in Acta Phytotax. Sin. 26(3): 215 (1988). Type: China, *Hsing & Chao* 77558 (type, NF).

CHINA. Guangxi, Yangsuo, on limestone hill, *Nanzhu* 2709 (IBSC); *Chen* 53442 (IBK); *Huang* 61344 (IBK); Pinguo, *Yi* A0013 (IKB).
VERNACULAR NAME. jian gang zhu (Chinese).

3. **Bonia levigata** (*L. C. Chia, H. L. Fung & Y. L. Yang*) *N. H. Xia* **comb. nov.**

Monocladus levigatus L. C. Chia, H. L. Fung & Y. L. Yang in Acta Phytotax. Sin. 26(3): 216 (1988). Type: China, *Nanzhu* 1620 (IBSC).

CHINA. Hainan, Baoting, Diaoluoshan, 350 m, *Diaoluoshan exped.* 2745 (IBSC), *Nanzhu* 1620 (IBSC); Wanning, Liulianling, 250 m, *Chung* 4323 (IBSC); Qiongzhong, 450 m, *Teng* 3629 (IBSC).
VERNACULAR NAME. xiang zhi zhu (Chinese).

4. **Bonia amplexicaulis** (*L. C. Chia, H. L. Fung & Y. L. Yang*) *N. H. Xia* **comb. nov.**

Monocladus amplexicaulis L. C. Chia, H. L. Fung & Y. L. Yang in Acta Phytotax. Sin. 26(3): 215 (1988). Type: China, *Nanzhu* 2256 (IBSC).

CHINA. Guangxi, Longzhou, on limestone hill, 300 – 500 m, *Chen* 13120 (IBSC), *Nanzhu* 2252 (IBSC); Pingxiang, on limestone hill, *Nanzhu* 2243 (IBSC); Longgang Nature Reserve, 450 m, *Longgang Exped.* 10195 (IBK); Longjing, *Huang* 61727 (IBK); *Dai* 7635 (GXFI); *Su* 805241 (GXFI); Luocheng, *Dai* 8049 (GXFI).
VERNACULAR NAMES. yung xiang zhu (Chinese), meigom (Zhuang).

5. **Bonia tonkinensis** *Balansa* in J. Bot. (Morot) 4: 29 (1890).

Bambusa tonkinensis (Balansa) Baill. in Nat. Hist. Pl. 12: 147 (1894); E.G. Camus in Bambusées 113 pl. 80 f. C (1913); E. G. Camus & A. Camus in Lecomte Fl. Gen. Indo-Chine 7: 610 (1923). Type: Vietnam, *Bon* s.n., (Herbarium Missionis Tunquini Occidentalis no. 2064) (P).

VIETNAM. Province of Nam Ham, Lat Sôn, 20°32'N, 105°53'E, *Bon* s.n., 23 Aug. 1890 (Herbarium Missionis Tunquini Occidentalis no. 4482) (K, P); Province Quang Binh, Vo Xa, 17°24'N, 106°38'E, on rocky limestone mountain, *Bon* s.n., 10 March 1891 (Herbarium Missionis Tunquini Occidentalis no. 4647) (P).
VERNACULAR NAME. Cây le (Vietnamese).

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