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A New Genus of Bamboos from the Cerrados of Brazil

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Recent advancements in our knowledge of New World bamboos have shown that the genus *Apoclada*, as previously recognized, is clearly polyphyletic. A new genus, *Filgueirasia*, is described in honor of Dr. Tarciso S. Filgueiras. Two species, *F. arenicola.* and *F. cannavieira* are recognized. *Apoclada simplex* remains in the now monotypic genus.

The genus, *Apoclada* F.A. McClure (1967) has been a source of consternation since it was first published. The type species, *Apoclada simplex* F.A. McClure and L.B. Smith, is a beautiful tall and luxuriant bamboo of the mesic forests of southeastern Brazil but the other species published at that time, *A. diversa* F.A. McClure and L.B. Smith, turned out to be nothing more than a teratological specimen of the type species (Guala 1992, 1995). Five years later McClure (1973) described the cerrado species *A. arenicola* F.A. McClure and transferred another cerrado species, *Arundinaria cannavieira* Alvaro da Silveira, out of that, then very broadly defined, genus to become *Apoclada cannavieira* (Alvaro da Silveira) F.A. McClure.

Cerrado is a type of open savanna found in central Brazil. Fire is common on the cerrados and the two cerrado species are well adapted to it with compact knotty rhizomes with many buds, and a short and multi-stemmed habit as well as relatively course leaves. They are both good forage (Guala 1992, 2001) and are eaten by both domestic stock and wildlife.

When I began work on this group in 1988, there was relatively little known about the affinities of the genus and about the extent and interpretation of the important structures in determining affinities to other genera. The characteristics that held *Apoclada s.l.* together were having multiple separate equal primary branch buds at the nodes (hence the name *"Apoclada"*) and a lack of fusiod cells in the leaves. At the time, relatively few specimens had been examined for fusoid cells and what appeared to be a phylogenetically significant lack of these common bamboo leaf structures is now known to be not so unusual, in some species varying even with light conditions (March and Clark 2001). Part of the branch bud misinterpretation for *A. simplex* was due in large part to the single teratological specimen referred to as *A. diversa* that clearly shows two separate branch buds at a single node. The branches emerge from bud extremely early in this species as well and the difficulty of interpreting the ontogeny of branch buds in general also led to confusion. This in relation to the clearly multiple equal primary buds in the cerrado species along with ambiguity in the interpretation of the characteristic in *A. simplex* by myself and other workers was enough not to question McClure's judgement and consider them all to be in a single genus. Emmet Judziewicz (pers. comm.) even questioned how I knew that *Apoclada* was monophyletic in a prepublication review of the manuscript of Guala (1995). My explanation to the editor was that although the evidence was weak, we did not at the time have clear evidence showing that *Apoclada s.l.* was not monophyletic, so I chose to stick with the *status quo* until such evidence was discovered.

New and much more extensive work on the interpretation and extent and derivation of different branch bud complement configurations and a much better knowledge of New World bamboos in general (see Judziewicz *et al.* 1999 and references therin) has led to better interpretations of important characteristics and a better understanding of relationships. It is clear now from this new morphological work alone that the cerrado species probably show a

different tribal affinity than *A. simplex*. The cerrado species show the refractive papillae, intercostal sclerenchyma fibers, reduced foliage leaf midribs and an asymmetric leaf margin that are characteristic of the Arthrostylidiinae while *A. simplex* shows an overall general resemblence to *Otatea* in the Guaduinae but differs in leaf anatomy. *Apoclada simplex* also has adaxial papillae, the overarching papillae associated with its adaxial stomata and the absence of stomata on the abaxial leaf surface that is characteristic of the Guaduinae. Recent molecular analyses (Guala *et al.* 2000) have also supported this placement of the cerrado species in the Arthrostylidiinae and *A. simplex* in the Guaduinae conclusively.

Thus, the genus *Apoclada*, as previously recognized, must be split leaving the type species, and hence the name, with *A. simplex*. This is counterintuitive given that *"Apoclada"* means separate branches – a designation that applies much better to the cerrado species – but the rules of nomenclature are clear (Greuter *et al.* 2000) and a new genus must be published for the cerrado species.

It is with great pleasure that I am able to name the new genus in honor of Dr. Tarciso S. Filgueiras. He was the person who first showed me living populations of these bamboos (see the cover of this issue) and who knows more than anyone about them in their natural habitat. He has been a source of endless enthusiasm, expertise and encouragement to those of us who study grasses as well as a positive force for systematics and systematists in Brazil and globally. There is no one who deserves this honor more.

Filgueirasia G.F. Guala *gen. nov.* TYPE: *Filgueirasia cannavieira* (Alvaro da Silveira) G.F. Guala.

Valde caespitosae, culmis cavis, gemmis multis aequalibus ramorum primariorum ad nodos (raro 1), laminis foliorum stomatibus in utraque pagina et fibris sclerenchymatis intercostalibus in mesophyllo instructis

Strongly caespitose bamboos, vegetative clumps 0.30-3.21 m in diameter. Rhizomes compact. Culms 0.45-1.75 m high (to 2.5 m in fertile condition), erect, green or glaucous, often short pubescent on new growth, straight, 1-9 mm in diameter, the walls 0.3-2 mm thick, the internodes rarely solid in fertile material, to 29.1 cm long. The vegetative midculm primary branch bud complement with 1-15 equal primary branch buds per node in both the vegetative and fertile culms. Culm leaves lanceolate, the sheath of those from the midculm 3.0-10.2 cm long, 0.4-2.7 cm wide at the base, glabrous on the abaxial and adaxial surfaces, adaxial ligule a short hyaline membrane to ca. 1 mm, the blades mostly erect to 39 mm long. Foliage leaf sheathes ciliolate to hispidulous or with copious white hairs and long flexuous white oral setae along the distal margin, the blade 3.3-31.4 cm long, 1.0-11.0 mm wide, stomata on both surfaces, the bulliform cells smooth on the surface and in fan-shaped groups of 3-12 cells in transverse section with one to several groups occurring between each pair of major vascular bundles, intercostal sclerenchyma fibers appressed to either side of the bulliform cell groups and often with up to 20 fiber strands above the bulliform cells near the abaxial surface, silica bodies rectangular to saddle or shield or double-axe shaped, bicellular microhairs 41-59 microns long with the basal cell longer than the distal cell and occurring only on the abaxial surface, the long cells of both epidermes papillate. Inflorescence branches secund, the spikelets 2.5-10.4 cm long, the florets 3-15 per spikelet, the lower lemmas 13-26 mm long, the upper lemmas 6-15 mm long, the palea subequal to the body of the lemma, 6-15 mm long, with two scabrous keels, scabrous to glabrous between the keels. Lodicules 1.3-2.5 mm long, ca. 0.6-1.6 mm wide, ovate to obovate, ciliate on the upper margins. Stamens 4.1-11.0 mm long. Style densely hispid, 0.3-0.6 mm long, the stigmas ca. 0.7-2 mm long. Caryopsis 8.3-9.9 mm long, 1.9-3.4 mm wide, with a beak ca. 0.4-0.7 mm long.

Phenology. The period between mass flowerings is unknown although it is not less than eleven years and is probably more than twenty. Flowering may also be linked to burning.

Distribution and Habitat. Normally found in cerrado from ca. 44-55 deg. W. long. and 15-21 deg. S. lat. at elevations of 550-1075 m.

Filgueirasia cannavieira (Alvaro da Silveira) G.F. Guala., *comb. nov.,* BASIONYM: *Arundinaria cannavieira* Alvaro da Silveira 1919. Algumas especies novas da flora de Minas Gerais. Archiv. Museo Nacional Rio de Janeiro. 22: 101 figure 2. TYPE: Brazil, Minas Gerais: Serra do Cabral [Serra do Caparão in publication], November 1918, Silveira 644 (holotype: R(6 + ca. 6 unmounted sheets)!; isotype: US!).

Filgueirasia arenicola (F.A. McClure) G.F. Guala., *comb. nov.,* BASIONYM: *Apoclada arenicola* F.A. McClure 1973. Genera of Bamboos Native to the New World Gramineae: Bambusoideae) Smithsonian Contributions to Botany 9; pp 9-12 + figures 1-2. TYPE: Brazil, Mato Grosso: Between Bonito and Rondonopolis, 8 March 1930, Chase 11886 (holotype US(2)!).

Key to the species:

Foliage leaf blades 5.0-11.0 mm wide, one major vascular bundle between each pair of bulliform cell strands in the middle 2/3 of the lamina. Culm leaves persistent. Midculm branch complements with usually 1-3 primary branches in vegetative condition or 1-8 in fertile condition. Keels of the palea without perceptible wings – *Filgueirasia cannavieira.*

Foliage leaf blades 1-2.7 mm wide, two or more major vascular bundles between each pair of bulliform cell strands in the middle 2/3 of the lamina. Culm leaves quickly deciduous. Midculm branch complements with usually 5-15 primary branches in vegetative condition or 8-15 in fertile condition. – *Filgueirasia arenicola.*

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