



***Parianella* (Poaceae, Bambusoideae): morphological and biogeographical information reveals a new genus of herbaceous bamboos from Brazil**

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Abstract

Differences in the inflorescence morphology and geographical distribution indicate that two species found in the Atlantic Rain Forest of southern Bahia, Brazil, do not belong to *Pariana*, a genus of herbaceous bamboos (tribe Olyreae, Poaceae) where they were previously classified. We describe a new genus, *Parianella*, in order to accommodate these two species. Their taxonomic affinities within subtribe Parianinae are discussed, and a key for identification of genera in this group is presented.

Key words: Atlantic Rain Forest, Bahia, Olyreae, Parianinae, *Eremitis*, *Pariana*

Resumo

Diferenças na morfologia da inflorescência e distribuição geográfica indicam que duas espécies encontradas na Mata Atlântica do sul da Bahia não pertencem a *Pariana*, um gênero de bambus herbáceos (tribo Olyreae, Poaceae) onde elas estavam anteriormente classificadas. Portanto, um novo gênero, *Parianella*, é descrito para acomodar estas duas espécies. As afinidades taxonômicas dentro da subtribo Parianinae são discutidas e é fornecida uma chave para identificação dos gêneros deste grupo.

Introduction

Pariana Aublet (1775: 876) and *Eremitis* Döll (1877: 338) are genera of herbaceous bamboo grasses (tribe Olyreae) included within the subtribe Parianinae. This subtribe is characterized by the varying presence of fimbriae at the apex of the leaf sheaths, sometimes referred to as oral setae, as well as spike-like synflorescences, consisting of successive gynecandrous whorls, each with a central female spikelet surrounded by five or six male ones (Calderón & Soderstrom 1980, Hollowell 1987, 1997, Judziewicz *et al.* 1999, Judziewicz & Clark 2007).

According to a recent classification, *Pariana* includes about 35 species distributed from Costa Rica and Panama to Bolivia and Brazil (Judziewicz *et al.* 1999, Oliveira *et al.* 2004, 2008), with a disjunction in their occurrence between the Amazon basin and the Atlantic Rain Forest of eastern Brazil (Soderstrom *et al.* 1988). *Eremitis* includes about five (Hollowell 1987, Judziewicz *et al.* 1999) or more species (Clayton & Renvoize 1986, Calderón & Soderstrom 1980), but up to now only one has been formally described, *E. parviflora* (Trinius 1834: 105) Calderón & Soderstrom (1980: 20). The latter genus displays a distribution restricted to the Brazilian Atlantic Forest, and is known only from Pernambuco, Bahia, Espírito Santo, Minas Gerais and Rio de Janeiro states (Hollowell 1987, Santos-Gonçalves 2000, Judziewicz *et al.* 1999, Oliveira *et al.* 2008). *Pariana* and *Eremitis* have been traditionally distinguished from other Olyreae by modifications in the structure of their inflorescences, as well as by the placement of these on individual plants (Fig. 1).

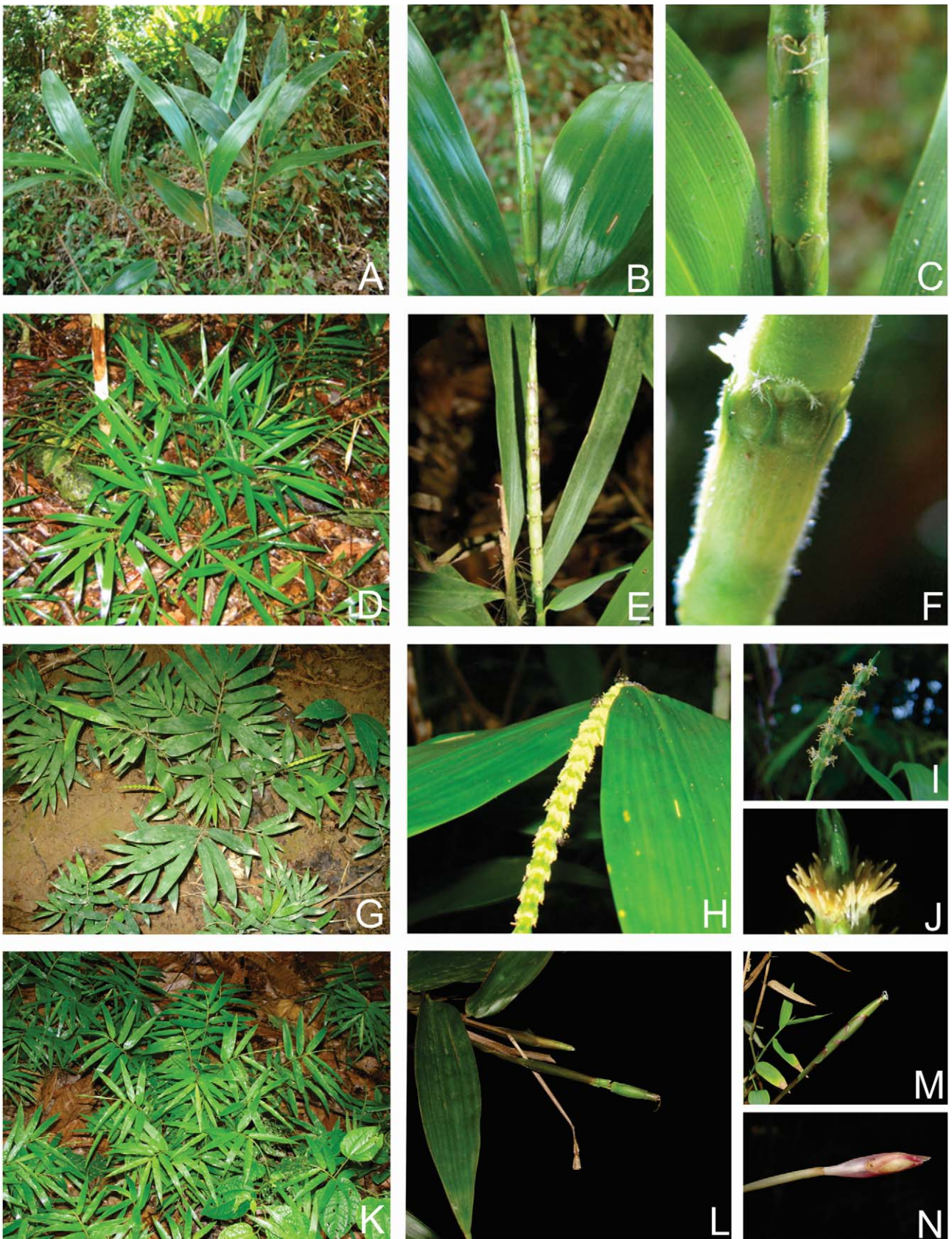


FIGURE 1. A–C. *Parianella carvalhoi*. A. Habit. B. Inflorescence on leafy culm. C. Detail of gynecandrous whorl. D–F. *Parianella lanceolata*. D. Habit. E. Inflorescence in leafy culm. F. Detail of gynecandrous whorl showing the stigmas barbate. G–J. *Pariana* spp. G. Habit. H. Inflorescence on leafy culm. I. Decumbent culm inflorescence. J. Detail of decumbent culm inflorescence showing the numerous stamens. K–N. *Eremitis* sp. nov. K. Habit. L. Inflorescence in leafy culm. M. Decumbent culm inflorescence. N. Underground culms inflorescence. (Photos A–C by Aline C. Mota; D–F by Marcos C. Dórea; G–J by Reyjane P. Oliveira; K–N by Fabrício M. Ferreira).

The inflorescence of *Eremitis* is strictly dimorphic (Hollowell 1987, Judziewicz *et al.* 1999), with only the conspicuous apical whorl (Hollowell 1987) or the most apical ones gynecandrous and articulate. Other basal whorls are not articulate and deciduous like the apical, and they are essentially male or sterile (Hollowell 1987, Judziewicz *et al.* 1999). The male spikelets of the gynecandrous whorl possesses laminar and elongated pedicels, which are three to four times longer than the associated spikelets (Hollowell 1987); similar structures are also observed in the underground inflorescences. The genus is also distinguished by only two stamens per floret and a barbate stigma (Hollowell 1987), which contrasts with the higher stamen number and the plumose stigmas observed in other bamboos, including *Pariana*, and other grasses (Fig. 1).

In *Pariana* all inflorescence whorls are gynecandrous, and the reduction to exclusively male whorls may occur, but only at the base or at apex of the inflorescences (Hollowell 1987). The pedicels of the male spikelets, the stamen number and the stigma shape has been traditionally considered variable within this genus, especially when comparing those species found in the Atlantic Rain Forest with others occurring in Central America and the Amazon basin.

Renvoize (1984) first noted certain peculiarities in the inflorescence of *Pariana lanceolata* Trinius (1834: 107), endemic to the state of Bahia, on the eastern coast of Brazil, observing that the pedicels of the male spikelets were much longer than the spikelets themselves, forming a tubular structure around the single female spikelet. Based on this character, so distinctive from other *Pariana* species, Renvoize (1984) suggested that *P. lanceolata* could belong to another genus. According to Clayton & Renvoize (1986), *P. lanceolata* shared with *Pariana parvispica* Pohl (1972: 73), endemic to Costa Rica, similarities in structure of the gynecandrous whorl, as well as in the stamen number and the presence of a barbate stigma, and that these species could constitute a segregate genus.

In a systematic study of the subtribe Parianinae, Hollowell (1987) stressed that *P. lanceolata* and *P. parvispica* appeared to be sufficiently distinct from other species of *Pariana* and proposed the segregation of both into a genus which she called *Parianella*, but the publication of this was not formalized. According to Hollowell (1987), the successive whorls of male spikelets with long laminar pedicels, the reduction in stamen number, and the stigma morphology clearly distinguishes *Parianella* from the typical *Pariana* species.

The current taxonomic circumscription of the Parianinae includes only *Eremitis* and *Pariana s.l.*; the latter genus includes two additional species, endemic to the Atlantic Rain Forest, Brazil, and described in the last decade: *P. carvalhoi* Oliveira & Longhi-Wagner (2004: 208), from southern Bahia, and *P. multiflora* Oliveira *et al.* (2008: 263), from Espírito Santo state.

Pariana carvalhoi and *P. lanceolata*, originally described within *Pariana*, both with distribution restricted to the Brazilian Atlantic Forest, differ from other congeners by the barbate stigma, the smaller number of stamens (two or three), and by the elongate, laminar pedicels associated with the male spikelets. In addition, they do not present conspicuous lunar marks laterally at the apex of fimbriate leaf sheaths (Hollowell 1987, 1997, Judziewicz *et al.* 1999), which is a remarkable character of the *Pariana* species occurring in the Amazon basin such as *P. campestris* Aublet (1775: 877) and *P. lunata* Nees von Esenbeck (1829: 295).

As now understood, *Pariana lanceolata* and *P. carvalhoi* represent a distinct group and they are herein transferred to the new genus *Parianella*. The transfer is based on morphological and biogeographical evidence, which together justify the taxonomic transfers proposed. The position of *Pariana multiflora* and *P. parvispica* and its relationship within the Parianinae will be further discussed in Ferreira *et al.* (in prep.).

Key to identification of *Parianella* and related genera in the Parianinae

1. Whorls of spikelets dimorphic, with one terminal gynecandrous whorl; lower whorls reduced, male*Eremitis*
1. Whorls of spikelets monomorphic, predominantly gynecandrous and similar 2
2. Pedicels of the male spikelets much longer than associated spikelets; stamens 2 to 3; stigmas barbate
.....*Parianella* (Atlantic Rain Forest, Bahia, Brazil)
2. Pedicels of the male spikelets shorter than or equal to associated spikelet; stamens 6 to 40 or more; stigmas plumose
.....*Pariana* (Central America and Amazon basin)

Taxonomic treatment

Parianella Hollowell, F.M.Ferreira & R.P.Oliveira, *gen. nov.* (Figs. 1–2)

Parianae et *Eremididis* *ullis verticillis inflorescentiae gynecandris* (*verticillis spicularum masculiarum perfectarum spiculam femineam cingentibus*) *affinis*. *Ab Pariana duobus vel tribus staminibus et stigmate barbato differt*. *Ad Eremididem stigmate barbato accedit, sed pluribus quam duobus verticillis gynecandris differt* (*Eremitis tantum uno vel duobus verticillis gynecandris praedita*).

Type:—*Parianella lanceolata* (Trin.) F.M.Ferreira & R.P.Oliveira

Plants with monomorphic stems, glabrous to pilose; nodes glabrous or ciliate, with a small conspicuous scar beneath. Leaf sheaths glabrous or ciliate at the margins; fimbriae present or absent; ligule membranous; leaf blades lanceolate or ovate-lanceolate, base symmetric to asymmetric, attenuate, apex symmetric, acute to acuminate, both blade surfaces glabrous or ciliate along the adaxial midrib, blade margins scaberulous. Inflorescence monomorphic, terminal, solitary and spiciform, with fragile rachis, bearing gynecandrous whorls with 4 or 5 male spikelets surrounding a central female spikelet. Female spikelet sessile, oblong, glabrous; glumes membranous, acuminate or shortly caudate, fully glabrous or with short trichomes at the apex; styles attenuate, glabrous, stigmata barbate. Male spikelets oblong-ovate, stramineous to green; pedicels long, laminar, usually pilose; glumes oblong-triangular, pilose; lemmas puberulent, 3-nerved; stamens 2 or 3. Caryopsis glabrous, cryptic but free within the persistent antherium, apex with erect stylar remnants, hilum linear.

Etymology:—The name *Parianella* refers to the diminutive of *Pariana*, the genus from which it is segregated.

Distribution:—The genus *Parianella* is endemic to the Atlantic Rain Forest in southern Bahia state, Brazil (Fig. 2).

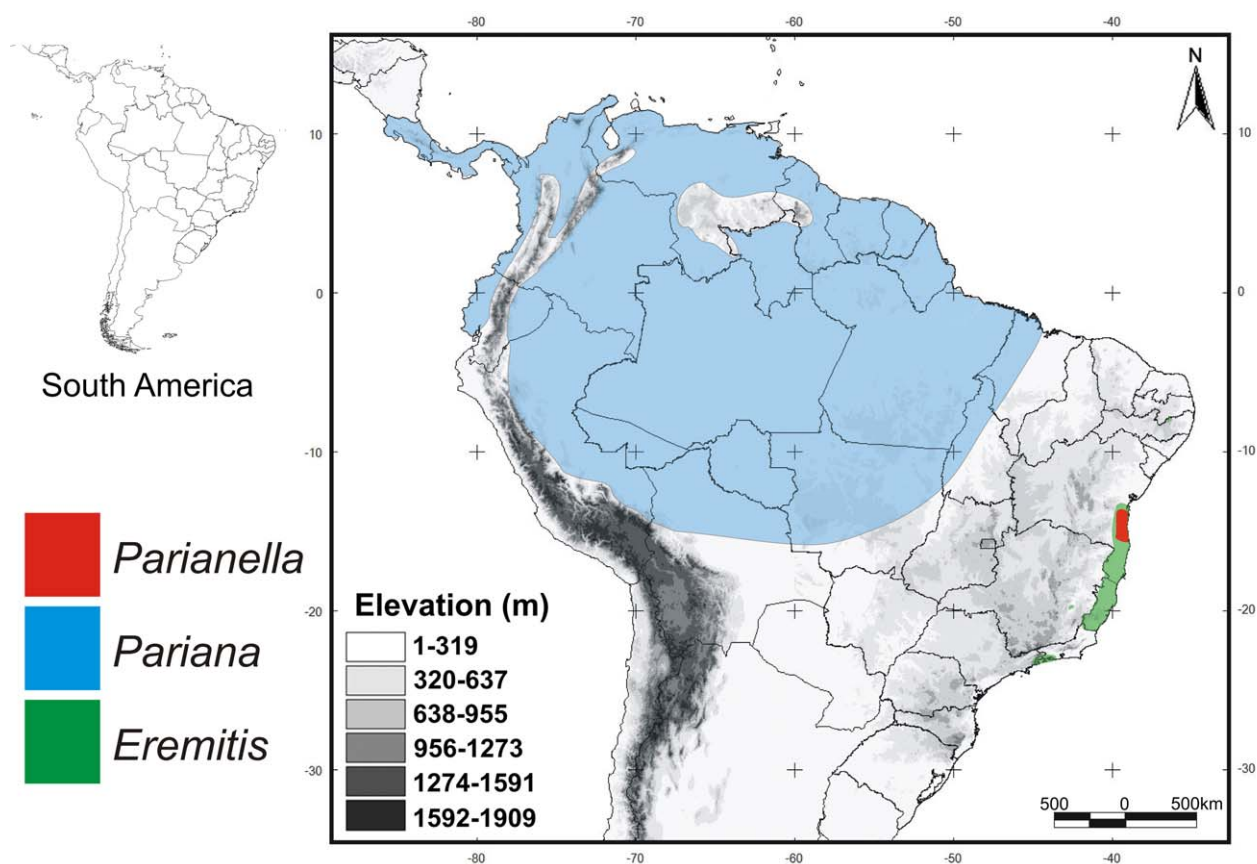


FIGURE 2. Geographic distribution of *Parianella*, *Pariana* and *Eremitis*.

***Parianella lanceolata* (Trin.) F.M.Ferreira & R.P.Oliveira, comb. nov.**

Basionym: *Pariana lanceolata* Trinius (1834: 107). Type:—BRAZIL. Bahia: *Riedel s.n.* (holotype LE!, isotype K!).

Distribution and habitat:—*Parianella lanceolata* is found only in Brazil, restricted to Bahia State, where it occurs in the shaded understory of the Atlantic Rain Forest, in both primary and disturbed habitats (Oliveira *et al.* 2004).

***Parianella carvalhoi* (R.P.Oliveira & Longhi-Wagner) F.M.Ferreira & R.P.Oliveira, comb. nov.**

Basionym: *Pariana carvalhoi* Oliveira & Longhi-Wagner (2004: 208). Type:—BRAZIL. Bahia: Una, along road São José/Una, 10 February 1994, A.M. Carvalho, L.G. Clark, T.S. dos Santos, W.W. Thomas & S. Sant'Ana 4382 (holotype CEPEC!, isotype ISC).

Distribution and habitat:—This species shares a similar distribution with *Parianella lanceolata* in southern Bahia, Brazil, but only a single population is known (Oliveira *et al.* 2008). For this reason, it was recently cited among the rare plant species of Brazil (as *Pariana carvalhoi*) by Oliveira *et al.* (2009).

Acknowledgments

The first author thanks the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, Brazil (CAPES) for the doctoral scholarship received. Thanks also to the Plantações Michelin da Bahia, in the person of Dr. Kevin Flesher, for financial and logistical support for field trips; the Fundação de Amparo à Pesquisa do Estado da Bahia (FAPESB, grants APR 0218/2008 and PNX0014/2009) and Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brazil for financial support (CNPq, grants 478901/2008-9, 562349/2010-3 and 563558/2010-5), and by fellowship grants given to Cássio van den Berg (PQ-1B) and Rejane Patrícia Oliveira (PQ2).

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