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MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E INOVAÇÕES
UNIVERSIDADE FEDERAL RURAL DA AMAZÔNIA
MUSEU PARAENSE EMÍLIO GOELDI
PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIAS BIOLÓGICAS



RAIMUNDO BALIEIRO LOPES NETO

POACEAE BARNHART NA SERRA DO CACHIMBO, AMAZÔNIA ORIENTAL,
BRASIL

BELÉM

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Dissertação apresentada à Universidade Federal Rural da Amazônia e ao Museu Paraense Emílio Goeldi como parte das exigências do Curso de Mestrado em Ciências Biológicas, área de concentração Botânica Tropical, para obtenção do título de mestre.

Orientador: Dr. Pedro Lage Viana.

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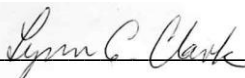
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Dr. Pedro Lage Viana – Orientador

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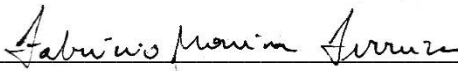
Dra. Lynn G. Clark – 1º Examinador(a)

IOWA STATE UNIVERSITY



Dr. Christian da Silva – 2º Examinador(a)

UNIVERSIDADE DO ESTADO DE SANTA CATARINA



Dr. Fabrício Moreira Ferreira – 3º Examinador(a)

UNIVERSIDADE FEDERAL DE UBERLÂNDIA

Dr. André dos Santos Bragança Gil – Suplente

MUSEU PARAENSE EMÍLIO GOELDI

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RESUMO

Poaceae Barnhart destaca-se como uma das maiores famílias de monocotiledôneas, com cerca de 11.500 espécies, 700 gêneros e 12 subfamílias. No Brasil, ocorrem 226 gêneros e 1490 espécies, sendo 122 gêneros e 500 espécies na Amazônia. É uma família de suma importância econômica e ecológica, ocorrendo nos mais variados ecossistemas do mundo, especialmente em áreas abertas. Na Amazônia, apesar da predominância de formações florestais, são encontradas áreas abertas, cuja caracterização é dificultada por discrepâncias na terminologia e carência de estudos sobre as comunidades vegetais, principalmente nas regiões de ecótono. A Serra do Cachimbo está localizada na transição Amazônia-Cerrado, apresentando características específicas de solo e altitude, além de um gradiente de fitofisionomias florestais, savânicas a campestres, condições propícias para alta riqueza e endemismo de Poaceae, incluindo bambus. Todavia, é uma região pouco estudada e sofreu nas últimas décadas com crescimento populacional desordenado, queimadas ilegais e avanço de pastagens. Nesse contexto, estudos florístico-taxonômicos são imprescindíveis por sistematizar o conhecimento da biodiversidade e esclarecer processos ecológicos e evolutivos. Portanto, o objetivo da dissertação foi realizar um estudo florístico da família Poaceae na Serra do Cachimbo, com enfoque na taxonomia da subfamília Bambusoideae. A área de estudo está localizada entre o Pará e Mato Grosso. Possui três unidades de proteção: Parque Estadual do Cristalino (MT), Reserva Biológica Nascentes da Serra do Cachimbo (PA) e Campo de provas Brigadeiro Velloso (PA). Duas expedições de coleta foram realizadas em 2019 e 2021, abrangendo as unidades localizadas no Pará. Além das amostras coletadas, foram examinadas as exsicatas de 18 herbários nacionais e internacionais que possuem coletas de gramíneas da Serra do Cachimbo. A dissertação está organizada em dois capítulos distintos. O primeiro capítulo apresenta uma listagem agrostológica com dados de habitat e comentários sobre distribuição geográfica de espécies endêmicas e invasoras. Foram encontradas 124 espécies, distribuídas em 54 gêneros e sete subfamílias. As subfamílias com maior riqueza foram Panicoideae (93) e Bambusoideae (16), seguidas de Chloridoideae (nove), Aristidoideae (três), Anomochlooideae (um), Micrairoideae (um) e Oryzoideae (um). Os gêneros com maior número de espécies foram *Paspalum* (19), *Panicum* (8), *Trichantheium* (8) e *Axonopus* (7). Três espécies são novos registros para o estado do Mato Grosso e 13 para o estado do Pará, desses, oito são novas ocorrências para a Amazônia. Duas espécies estão sendo analisadas e possivelmente são novas para a ciência. O segundo capítulo apresenta um estudo taxonômico de bambus, no qual foram encontrados nove gêneros e 16 espécies, sendo quatro novas ocorrências e duas espécies possivelmente novas. São apresentadas descrições morfológicas, chaves de identificação, dados

de distribuição geográfica e habitat, comentários taxonômicos e fotografias. Apesar da alta diversidade de gramíneas quando comparada com outras listagens agrostológicas da Amazônia, uma pequena parte da Serra foi amostrada. Um estudo mais aprofundado é necessário para preencher as lacunas de conhecimento da flora da região.

Palavras-chave: Taxonomia, Florística, Bambusoideae, Gramineae.

ABSTRACT

Poaceae Barnhart is one of the largest families of monocotyledons, with 11,500 species, 700 genera and 12 subfamilies. In Brazil, 1490 species in 226 genera are recorded, of this total, 500 species and 122 genera occur in the Amazon. It is a family of economic and ecological importance, occurring in several ecosystems of the world, especially in open formations. In the Amazon, although forests are dominant, open areas are found, and their characterization is hindered by discrepancies in terminology and lack of studies on plant communities, especially in ecotonal regions. The Serra do Cachimbo is located in the Amazon-Cerrado transition, with specific soil and altitude characteristics, and a gradient rainforests, savannas and grasslands habitats, which are conducive to both richness and endemism of grasses, including bamboos. However, it is a poorly studied region and has suffered in recent decades with disordered population growth, illegal burning and advancing pastures. In this context, floristic-taxonomic studies are essential for systematizing knowledge on biodiversity and clarifying ecological and evolutionary processes. The aim of the dissertation was to carry out a floristic study of the Poaceae (focusing on the taxonomy of the subfamily Bambusoideae) in the Serra do Cachimbo. The study area is located between Pará and Mato Grosso states; it has three protected areas: Parque Estadual do Cristalino (MT), Reserva Biológica Nascentes da Serra do Cachimbo (PA) and Campo de provas Brigadeiro Velloso (PA). Two field expeditions are carried out in 2019 and 2021, covering the units in Pará. In addition to the samples collected, we examined the specimens of 18 national and international herbaria that have collections of grasses from Serra do Cachimbo. The dissertation is structured in two distinct chapters: the first presents a checklist with habitat data, along with comments on the geographic distribution of endemic and invasive species. 124 species was found, distributed in 54 genera and seven subfamilies. Panicoideae (93) and Bambusoideae (16) are the most diverse subfamilies, follow by Chloridoideae (9), Aristidoideae (3), Anomochlooideae (1), Micrairoideae (1) e Oryzoideae (1). The richest genera were *Paspalum* (19), *Panicum* (8), *Trichantheium* (8) and *Axonopus* (7). Three species are recorded for the first time in the Mato Grosso state and 13 in the Pará, of these, eight are new occurrences for the Amazon. Two species are being analyzed and are possibly new species to

science. The second chapter presents a taxonomic study of bamboos. 16 species and nine genera were found, four species constitute new state records and two are possibly new species. Morphological descriptions, identification keys, geographic distribution and habitat data, taxonomic comments and photographs are presented. Despite the high diversity of grasses when compared to other Amazon agrostological checklists, only a small part of the area was sampled. A more in-depth study is needed to uncover the knowledge gaps in the flora.

Key-words: Taxonomy, Floristics, Bambusoideae, Gramineae.

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1. CONTEXTUALIZAÇÃO

Poaceae (ou Gramineae) é uma das maiores famílias de monocotiledôneas, com distribuição cosmopolita e 11.337 espécies e 707 gêneros registrados, distribuídos em 12 subfamílias (KELLOGG, 2015; SORENG *et al.*, 2017; STEVENS, 2021). Morfologicamente, apresenta uma variedade de hábitos, formas de folhas e indumentos, tipos de sinflorescências e de espiguetas, etc. (para descrição completa da família, ver KELLOGG, 2015).

As gramíneas possuem uma grande importância ecológica, fornecendo diversos serviços ecossistêmicos, como estoque de carbono, produtividade primária e ciclagem de nutrientes (GIBSON, 2009). Tem suma importância cultural e econômica para o ser humano, visto que a domesticação de espécies foi um processo fundamental para o desenvolvimento de comunidades sedentárias em função da agricultura, além de atualmente serem um dos principais recursos de alimentação básica humana e na produção de ração para gado (KELLOGG, 1998).

A ocupação de diferentes habitats durante sua diversificação propiciou a atual distribuição da família de ambientes temperados a tropicais e, por conseguinte, sua representatividade em formações vegetais distintas, como a ocupação de florestas – a exemplo da subfamília Bambusoideae – e expansão de formações abertas (“grasslands”) durante o Mioceno (OSBORNE, 2007).

O domínio dos bambus lenhosos e herbáceos em clareiras e bordas de florestas e sub-bosque, respectivamente, denotam importante função desses em ecossistemas florestais (JUDZIEWICZ *et al.* 1999). Ademais, a subfamília Bambusoideae é um grupo com potencial função econômica/cultural, de paisagismo a matéria-prima para artesanato, movelaria e até construções (KELLOGG, 2015).

As formações abertas dominadas por gramíneas compreendem cerca de 20% da cobertura vegetal do planeta (KELLOGG, 2001). Esse domínio está relacionado a diversos fatores ambientais ao longo do seu processo evolutivo, tais como: tolerância à alta salinidade, comum em Poaceae; baixa temperatura, a exemplo das pradarias da subfamília Pooideae (via rota fotossintética C3) em regiões temperadas; alta temperatura, frequência de incêndios, baixo CO₂ atmosférico e poucos nutrientes disponíveis, principalmente nas savanas tropicais com grande representatividade de espécies do clado PACMAD (que inclui diversos táxons com a rota C4) (STEVENS, 2021).

No Brasil, todos os biomas apresentam formações vegetais abertas, sejam predominantes (como na Caatinga, Cerrado e Pampas) ou entremeados por florestas (expressivamente na Mata Atlântica e Amazônia) (IBGE, 2012). A identificação das formações abertas da Amazônia é dificultada particularmente pelas diferentes terminologias aplicadas, seja a utilização de conceitos de outras fitofisionomias, que apresentam diferentes comunidades e processos ecológicos (como “Caatinga da Amazônia”), ou termos muito abrangentes (“Campina”, “Campinarana”, “Savana Amazônica”) (LISBOA, 1975). Regiões de ecótono, principalmente entre Amazônia e Cerrado, não se enquadram nas definições genéricas, ademais, carecem de estudos florísticos que forneçam dados das comunidades contíguas aos habitats (LLERAS; KIRKBRIDE, 1978; RADAMBRASIL, 1980).

A Serra do Cachimbo (Sul da Amazônia Oriental) é um exemplo de área localizada nessa transição, onde há uma diversidade de fitofisionomias, de florestas ombrófilas e estacionais a savanas e campos naturais (RADAMBRASIL, 1980). Poucos estudos botânicos foram realizados na área, mas nenhum trabalho florístico-taxonômico para grupos de angiospermas foi publicado até o momento. Todavia, diversas espécies endêmicas foram descritas (e.g. HARLEY, 2012; PRUSKI; URBARSCH, 1988), incluindo três espécies de Poaceae (BURMAN, 1982; MORRONE; ZULOAGA, 2001; ZULOAGA; MORRONE, 1996). Esse endemismo é justificado pela localização em uma área de contato de formações geológicas e transição climática, apresentando funções ecossistêmicas e comunidades contíguas (MILAN; MORO, 2016).

Em contrapartida, é uma região bastante ameaçada devido a conflitos fundiários, garimpo ilegal e principalmente incêndios e desmatamentos para o avanço da agropecuária (ALENCAR, 2005; ICMBIO, 2018; IMAZON, 2019; RADAMBRASIL, 1980), apesar do solo arenoso e relevo acidentado serem inadequados para essa atividade, acarretando em assoreamento de rios importantes da região (ICMBIO, 2009; RADAMBRASIL, 1980). Nesse cenário, estudos taxonômicos associados a floras são imprescindíveis para fornecer dados acerca da comunidade vegetal da região, tornando-se alicerces para políticas de proteção ambiental.

O objetivo deste trabalho foi realizar um levantamento florístico-taxonômico das espécies de Poaceae ocorrentes na Serra do Cachimbo, Amazônia Oriental, Brasil. É apresentada uma listagem documentada das espécies e ocorrência nos habitats da Serra do Cachimbo; são comentadas as espécies com destaque em relação a distribuição geográfica, como endêmicas, ruderais e novas ocorrências para os estados do Pará e Mato Grosso, bem como possíveis novas espécies para ciência. Também é apresentado um tratamento taxonômico para a subfamília

Bambusoideae, no qual são fornecidas descrições morfológicas, chaves de identificação, compilação de dados de distribuição geográfica e habitat, comentários taxonômicos comparativos e fotografias das espécies registradas.

A dissertação está dividida em dois capítulos: 1) Listagem documentada de Poaceae Barnhart da Serra do Cachimbo, Amazônia Oriental, Brasil; 2) Native bamboos (Poaceae: Bambusoideae) from Serra do Cachimbo, Eastern Amazon, Brazil.

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2. CAPÍTULO I

LISTAGEM DOCUMENTADA DE POACEAE BARNHART DA SERRA DO CACHIMBO, AMAZÔNIA ORIENTAL, BRASIL

RESUMO

Esse trabalho apresenta uma listagem das espécies de Poaceae da Serra do Cachimbo, Amazônia Oriental, Brasil. Foram encontradas 124 espécies, distribuídas em 54 gêneros e sete subfamílias. As subfamílias com maior riqueza foram Panicoideae (93) e Bambusoideae (16), seguidas de Chloridoideae (nove), Aristidoideae (três), Anomochlooideae (um), Micrairoideae (um) e Oryzoideae (um). Os gêneros com maior número de espécies foram *Paspalum* (19), *Panicum* (oito), *Trichantheicum* (oito) e *Axonopus* (sete). Três espécies são novos registros para o estado do Mato Grosso e 13 para o estado do Pará e oito são novas ocorrências para a Amazônia. *Arthrostylidium* sp. e *Merostachys* sp. estão sendo analisados e possivelmente representam espécies novas para ciência. Os resultados demonstram uma riqueza alta, quando comparado com outras listagens agrostológicas da Amazônia.

Palavras-chave: Ecótono, Florística, Gramineae

ABSTRACT

This work presents a checklist of Poaceae from Serra do Cachimbo, Eastern Amazon, Brazil. 124 species was found in the area, distributed in 54 genera and seven subfamilies. Panicoideae (93) and Bambusoideae (16) are the most diverse subfamilies, follow by Chloridoideae (9), Aristidoideae (3), Anomochlooideae (1), Micrairoideae (1) e Oryzoideae (1). The richest genera were *Paspalum* (19), *Panicum* (8), *Trichantheicum* (8) and *Axonopus* (7). Three species are recorded for the first time in the Mato Grosso state and 13 in the Pará, of these, eight are new occurrences for the Amazon. *Arthrostylidium* sp. and *Merostachys* sp. are being analyzed and possibly represent new species to science. The results demonstrate a high diversity of Poaceae, when compared to other Amazonian agrostological checklists.

Key-words: Ecotone, Floristics, Gramineae

2.1. INTRODUÇÃO

Poaceae Barnhart possui distribuição cosmopolita e destaca-se como uma das maiores famílias de monocotiledôneas, com cerca de 11.300 espécies e 700 gêneros, distribuídos em 12 subfamílias (KELLOGG, 2015; SORENG *et al.*, 2017; STEVENS, 2021). No Brasil, são registradas 1.551 espécies e 232 gêneros e desses, 495 espécies e 118 gêneros ocorrem na Amazônia (FLORA DO BRASIL 2020a). É um grupo de grande importância ecológica, ocupando diversos habitats, de ambientes florestais (principalmente membros da subfamília Bambusoideae) até formações abertas (destacando-se a subfamília Panicoideae, cuja eficiente via fotossintética C4 evoluiu em vários clados) (JUDZIEWICZ *et al.*, 1999; KELLOGG, 2015). As formações abertas dominadas por gramíneas (*grasslands*) correspondem a cerca de 20% da cobertura vegetal do planeta (JUDZIEWICZ *et al.*, 1999; KELLOGG, 2001).

Somente nas últimas décadas que estudos florístico-taxonômicos focando Poaceae se intensificaram no Brasil (e.g. DIAS-MELO *et al.*, 2009; FERREIRA *et al.*, 2009; LONGHI-WAGNER *et al.*, 2001; MACIEL; ALVES, 2014; MOTA; OLIVEIRA, 2011; Pimenta *et al.*, 2012; RODRIGUES; FILGUEIRAS, 2014; SCHMIDT; LONGHI-WAGNER, 2009; VIANA; FILGUEIRAS, 2008; WELKER; LONGHI-WAGNER, 2007). Todavia, poucos estudos foram realizados na Amazônia, principalmente devido à falta de cientistas na região, dificuldades logísticas e de recursos humanos (VIANA *et al.*, 2016), embora a diversidade do bioma esteja subestimada e esta seja uma área com importância política, econômica e ecológica (CARDOSO *et al.*, 2017).

Entre os estudos mais recentes sobre Poaceae na Amazônia, destacam-se o de Rocha e Lins (2009) em áreas alagáveis do nordeste do Pará, o de Rocha *et al.* (2014) em savanas costeiras do Amapá e Pará e o de Viana *et al.* (2018) nas cangas da Serra dos Carajás, sudeste do Pará, onde listaram 83, 58 e 87 espécies, respectivamente.

No Brasil, formações abertas podem ser encontradas como fitofisionomia predominante em biomas como a Caatinga, o Cerrado e o Pampas, ou entremeada por florestas, como na Amazônia e Mata Atlântica (IBGE, 2012). Na Amazônia, a caracterização de suas formações e estudo das comunidades vegetais são dificultados pela escassez de coletas e pelas diferentes terminologias aplicadas nos estudos no último século (LISBOA, 1975), principalmente em regiões de ecótono, como na transição Amazônia-Cerrado (LLERAS; KIRKBRIDE JR, 1978).

A Serra do Cachimbo está localizada ao sul da Amazônia Oriental, na divisa dos estados do Pará e Mato Grosso e é uma região com grande diversidade de fitofisionomias, que vão desde

florestas ombrófilas e estacionais a savanas e campos naturais (RADAMBRASIL, 1980). Apesar da atenção recebida durante o século XX nas atividades do Projeto Flora nos anos 80 (ACKERLY, 1989) e da elaboração da Folha Juruena S21 do RADAMBRASIL (1980), não há trabalhos de cunho florístico-taxonômicos nessa área, porém, diversas espécies endêmicas foram descritas (e.g. HARLEY, 2012; PRUSKI; URBATSCH, 1988), incluindo três espécies de Poaceae (BURMAN, 1982; MORRONE; ZULOAGA, 2001; ZULOAGA; MORRONE, 1996). A região é propícia a ter comunidades botânicas distintas de outras áreas na Amazônia e potencial grau de endemismo devido sua posição em um ecótono entre Amazônia e Cerrado, altitude elevada para os parâmetros da região e solo predominantemente arenoso (MINISTÉRIO DO MEIO AMBIENTE, 2007; RADAMBRASIL, 1980).

Problemáticas da área estão relacionadas com a criação da BR-163 (Santarém-Cuiabá), que acarretou no crescimento populacional desordenado e situação fundiária indefinida (ALENCAR, 2005). Ademais, garimpos ilegais (G1a, 2021) e incêndios e desmatamentos para o avanço da agropecuária são crescentes na região (ICMBIO, 2018; EXAME, 2019), ocasionando o envenenamento de rios e comunidades indígenas adjacentes e erosão e assoreamento de nascentes importantes das bacias do Xingu e Tapajós (ICMBIO, 2009; RADAMBRASIL, 1980). Em contrapartida, houve um aumento de 34% no desmatamento no Pará entre 2018 e 2019, principalmente no município de Altamira (IMAZON, 2019), que foi a cidade mais desmatada da Amazônia em janeiro de 2021 (G1b, 2021).

Nesse contexto, levantamentos florísticos fornecem informações elementares para o conhecimento científico básico de uma região. Esses trabalhos visam sistematizar o conhecimento da flora local, que pode esclarecer processos ecológicos e evolutivos, além de auxiliar pesquisas sobre espécies ameaçadas, com importância econômica e/ou sociocultural (CARDOSO *et al.*, 2017; WINSTON, 1999).

Esse trabalho tem como objetivo fornecer uma listagem florística documentada das espécies de Poaceae na Serra do Cachimbo, incluindo os estados do Pará e Mato Grosso, acompanhada de dados sobre distribuição geográfica, habitats, ocorrência e informações ecológicas.

2.2. MATERIAL E MÉTODOS

A Serra do Cachimbo é um complexo montanhoso de 300 a 700 metros de altitude, localizado na divisa dos estados do Pará e Mato Grosso, Amazônia Oriental, Brasil (RADAMBRASIL, 1980) (figura 1). É uma área prioritária para conservação da biodiversidade (MINISTÉRIO DO MEIO AMBIENTE, 2007). Atualmente é formada por um mosaico de unidades: Campo de

Provas Brigadeiro Velloso (CPBV), da Força Aérea Brasileira (FAB) e Reserva Biológica Nascentes da Serra do Cachimbo (REBIONSC), do Instituto Chico Mendes de Conservação da Biodiversidade (ICMBIO), no Pará; e Parque Estadual do Cristalino I e II (PEC I/PEC II), da Secretaria de Meio Ambiente do Mato Grosso (SEMA-MT) no Mato Grosso (figura 1).

O solo predominante é formado por areias quartzosas e litólicas; ao norte ocorrem afloramentos rochosos de relevo montanhoso e no sul há duas manchas concrecionárias lateríticas distróficas (RADAMBRASIL, 1980). O clima é do tipo Am de acordo com a classificação de Köppen. A temperatura média é de 32°C, o período seco compreende aos meses de junho a agosto, com temperatura máxima de 39°C e comum ausência total de chuvas, e o período chuvoso ocorre de setembro a maio, com pico de precipitação em março e temperatura mínima de 20°C (RADAMBRASIL, 1980; SUDAM, 1984).

Devido a sua localização na transição dos biomas Amazônia e Cerrado, a Serra possui um gradiente de formações de floresta e savana, além de áreas de tensão ecológica e formações pioneiras (LLERAS; KIRKBRIDE JR, 1973; RADAMBRASIL, 1980). Para a classificação de habitat, utilizamos RADAMBRASIL (1980): cerradão, campo cerrado, campo sujo, campo limpo, floresta estacional decidual, floresta estacional semidecidual e floresta ombrófila aberta. A partir de observações em campo, também foram adicionadas as categorias de campo rupestre e área antropizada.

Duas expedições de coleta foram realizadas, a primeira em setembro-outubro de 2019 e a segunda em maio de 2021, abrangendo o CPBV e a REBIONSC (fig.1). Foi utilizado o método de caminhamento de Filgueiras *et al.* (1994), o material foi coletado e herborizado utilizando técnicas convencionais em estudos botânicos e recomendações específicas para a família Poaceae (FIDALGO; BONONI, 1984; SODERSTROM; YOUNG, 1983) e, posteriormente, depositado no herbário MG (acrônimos de acordo com THIERS, 2021).

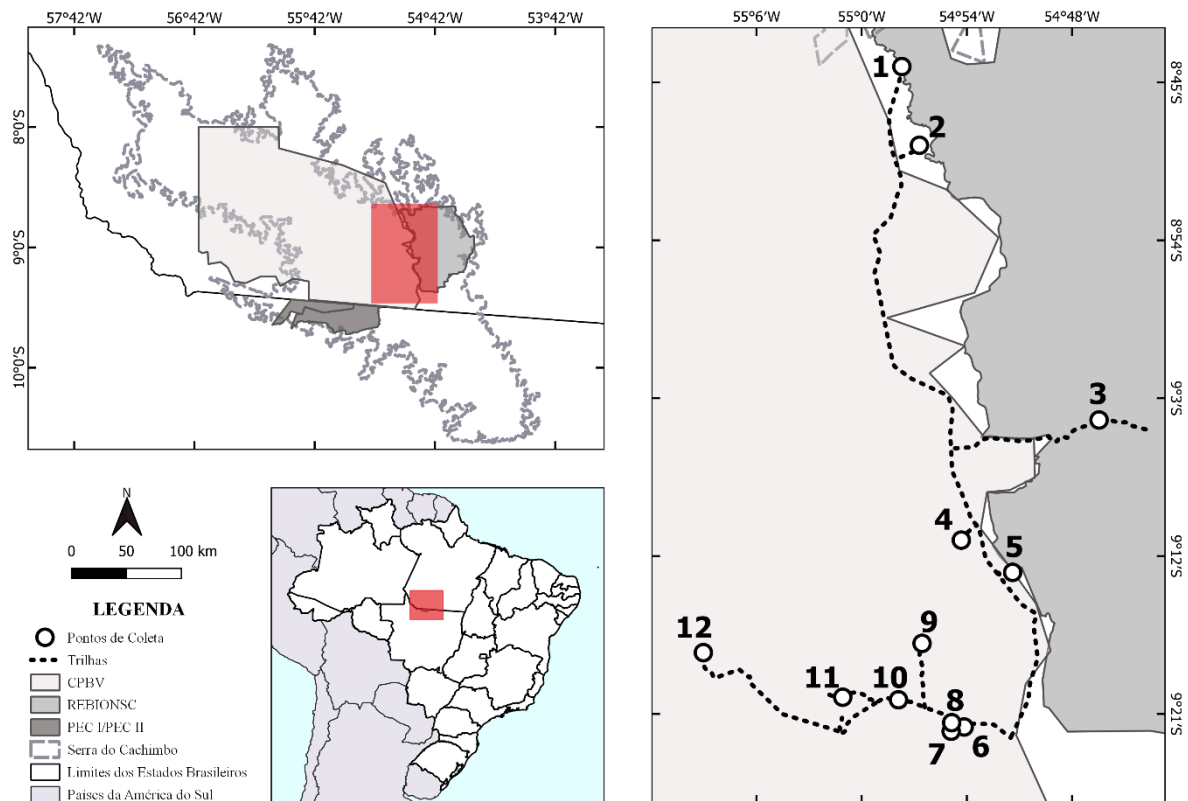


Figura 1 - Localização geográfica da Serra do Cachimbo com indicação dos pontos de coleta. Legenda: (1) Cachoeira do Curuá; (2) Empresa Areia Alto da Serra; (3) Estrada principal da REBIONSC; (4) Nascente do Rio Braço Norte; (5) Fazenda Carrefour; (6) Toca das Ariranhas; (7) Olho d'água; (8) Sede administrativa do CPBV; (9) Estande de Tiros; (10) Aeroporto do CPBV; (11) Ponte do Rio Formiga; (12) Cachoeira da Harpia.

Além do material coletado durante esse presente estudos, foram compilados dados de 18 herbários nacionais e internacionais que continham espécimes de Poaceae provenientes da Serra do Cachimbo: BHCN, CEN, CNMT, ESA, HERBAM, HUEFS, IAN, ICN, INPA, MG, MO, NY, RB, SP, SPF, UB, UFMT e US (acrônimos segue THIERS, 2021). As amostras foram analisadas *in loco* ou por meio de fotografias solicitadas aos curadores ou disponíveis no site Specieslink (<http://splink.cria.org.br/>).

A classificação de subfamílias e gêneros seguiu Soreng *et al.* (2017). O nome correto dos táxons e abreviatura dos nomes dos autores seguiu a Flora do Brasil 2020 (<http://floradobrasil.jbrj.gov.br/>). A identificação foi feita por meio de literatura especializada: ANDERSON, 1974; BOECHAT, 2005; BOECHAT; LOGHI-WAGNER, 1995; BOECHAT; LOGHI-WAGNER, 2001; CANTO-DOROW, 2020; CIALDELLA *et al.*, 2006; CLAYTON, 1978; DAVIDSE, 1978; DE GENNARO, 2011; DENHAM *et al.*, 2005; DÓREA, 2020;

FILGUEIRAS, 1984; FLORA DO BRASIL 2020b, 2020c, 2020d, 2020e, 2020f, 2020g, 2020h; GUGLIERI *et al.*, 2004; HOLLOWELL, 1987; JESUS-COSTA *et al.*, 2018; JUDZIEWICZ; CLARK, 1993; LOGHI-WAGNER, 1990; LONDOÑO; CLARK, 2002; LONDOÑO; JUDZIEWICZ, 1991; MACIEL *et al.*, 2009; McCLURE, 1973; MOLINA; RÚGOLO, 2004; OLIVEIRA; REIS, 2020; OLIVEIRA; CLARK, 2020; PEICHOTO, 2010; REIS; OLIVEIRA, 2020a; REIS; OLIVEIRA, 2020b; RENVOIZE, 1984; RIBEIRO *et al.*, 2020; ROCHA; VALLS, 2020; RODRIGUES, 2020; RÚGOLO, 1974; SEDE *et al.*, 2009; SENDULSKY, 1997; SENDULSKY; SODERSTROM, 1984; SILVA, A.S. 2017; SILVA, C. 2017; SILVA, A.S.; OLIVEIRA, 2020; SILVA, C. 2020; SILVA, C.; OLIVEIRA 2020a; SILVA, C.; OLIVEIRA 2020b; SILVA, C.; OLIVEIRA 2020c; SILVA, C.; OLIVEIRA 2020d; SODERSTROM, 1981; SODERSTROM; ZULOAGA, 1989; SOUSA *et al.*, 2020; TUTIN, 1936; VINÍCIUS-SILVA *et al.*, 2020; WELKER, 2020; ZANIN; LOGHI-WAGNER, 2006; ZULOAGA *et al.*, 1987; ZULOAGA *et al.*, 2011; ZULOAGA; JUDZIEWICZ, 1991.

Quando necessário, foram analisadas as obras originais e tipos digitalizados e disponíveis nos sites Biodiversity Heritage Library (<http://www.biodiversitylibrary.org/subject/Botany>), Botanicus Digital Library (<http://www.botanicus.org/>) e JSTOR Global Plants (<https://plants.jstor.org/>). Os dados de distribuição geográfica e habitat foram sistematizados por consulta de tratados taxonômicos, ao site da Flora do Brasil 2020, observações nas etiquetas e anotações em campo. A classificação de espécies invasoras seguiu o site da Flora do Brasil 2020.

2.3. RESULTADOS E DISCUSSÃO

Foram analisadas 327 exsicatas de Poaceae da Serra do Cachimbo, sendo 178 provenientes das expedições de coleta realizadas neste estudo. Foram encontradas 124 espécies, distribuídas em 54 gêneros e sete subfamílias (tabela 1). A subfamília com maior riqueza foi Panicoideae (93), seguida de Bambusoideae (16), Chloridoideae (9), Aristidoideae (3), Anomochlooideae (1), Micrairoideae (1) e Oryzoideae (1). Os gêneros com maior número de espécies foram *Paspalum* L. (19), *Panicum* L. (8), *Trichantheium* Zuloaga & Morrone (8) e *Axonopus* P. Beauv. (7), todos da subfamília Panicoideae.

A alta riqueza de Panicoideae (75%) pode ser justificada pela ocorrência de espécies típicas de ambientes savânicos, fitofisionomia predominante na Serra do Cachimbo. Em segundo lugar, a subfamília Bambusoideae (12,9%) representa a maioria das espécies em ambientes florestais, com exceção de *Actinocladum verticillatum* (Nees) McClure ex Soderstr. (típica de Cerrado,

porém encontrada em mata ciliar de Floresta ombrófila aberta na Cachoeira do Curuá), *Raddiella esenbeckii* (Steud.) C.E. Calderón & Soderstr. (Campo cerrado, Campo rupestre) e *R. minima* Judz. & Zuloaga (Campo rupestre).

Dezesseis das 124 espécies encontradas são invasoras, correspondendo a 12,9% do total. Elas foram coletadas principalmente em áreas antropizadas como na sede administrativa do CPBV, nos arredores da BR-163 e nas estradas de fazendas na REBIONSC. Entre elas, destacam-se *Megathyrus maximus* (Jacq.) B.K.Simon & S.W.L.Jacobs, *Melinis minutiflora* P. Beauv. e *Sporobolus indicus* (L.) R. Br..

Algumas espécies se destacam devido a sua distribuição, como *Paspalum auricomum* (A.G. Burm.) S. Denham, *Paspalum cachimboense* Davidse, Morrone & Zuloaga e *Trichantheium nutabundum* (Zuloaga & Morrone) Zuloaga & Morrone são endêmicas da Serra do Cachimbo (BURMAN, 1982; MORRONE; ZULOAGA, 2001; ZULOAGA; MORRONE, 1996). O bambu herbáceo *Raddiella malmeana* (Ekman) Swallen, é endêmico do sul do Pará e norte do Mato Grosso e é encontrado sob rochas em cachoeiras, enquanto *Raddiella minima* é um dos menores bambus do mundo e é conhecido apenas de sua localidade-tipo (na Serra do Cachimbo) (ZULOAGA; JUDZIEWICZ, 1991) e de uma campina no município de Canutama (AM). *Olyra taquara* Swallen ocorre em florestas de galeria no Brasil Central (DF, GO, MT, MG, MS e PA) (SODERSTROM; ZULOAGA, 1989). E *Arundoclaytonia* Davidse & R.P. Ellis é um gênero monoespecífico encontrado em campinas na região Norte (AM e PA) (DAVIDSE; ELLIS, 1987).

Foram confirmadas 16 espécies que são novos registros estaduais, sendo oito novas ocorrências para o bioma Amazônico. Três espécies são registradas pela primeira vez no estado do Mato Grosso: os bambus herbáceos sul-americanos *Pariana radicyflora* Sagote ex Döll e *P. zingiberina* Rich. ex Döll, anteriormente conhecidos no Brasil nos estados do Amazonas e Pará e Acre, Amapá e Pará, respectivamente (JUDZIEWICZ *et al.* 2000; FLORA DO BRASIL 2020c); e a Panicoideae *Ocellochloa stolonifera* (Poir.) Zuloaga & Morrone, que é amplamente distribuída do México e Caribe até América do Sul; no Brasil apresenta registros na região Norte (AC, AM, AP, PA e RR), Nordeste (BA), Centro-Oeste (MS), Sudeste (MG, RJ, SP) e Sul (PR, RS) (SEDE *et al.* 2009).

No estado do Pará, são 13 novas ocorrências: duas delas correspondem aos bambus lenhosos endêmicos do Brasil, *Arthrostylidium simpliciusculum* (Pilg.) McClure, conhecido da região Norte (AM) (JUDZIEWICZ; CLARK, 1993), e *Eremocaulon capitatum* (Trin.) Londoño,

registrado na região Centro-Oeste (GO, MT e MS) (LONDOÑO; CLARK, 2002). Uma espécie é da subfamília Chloridoideae, *Chloris virgata* Sw., que é amplamente distribuída na América, África e Ásia, com ocorrência na Europa e Oceania (ANDERSON, 1974; KELLOGG *et al.* 2020; MOLINA; RÚGOLO, 2004); no Brasil foi anteriormente registrada somente na região Nordeste (AL, BA, CE, MA, PB, PE, PI, RN e SE) e o gênero *Chloris* Sw. não possui registro no Pará (MACIEL, 2020), provavelmente pela falta de coletas por serem espécies ruderais.

As demais dez novas ocorrências para o Pará são da subfamília Panicoideae: *Elionurus bilinguis* (Trin.) Hack., registrada na Bolívia e no Brasil, nas regiões Norte (RR, TO) e Centro-Oeste (GO, MT) (JØRGENSEN *et al.*, 2014; FLORA DO BRASIL 2020d); *Digitaria eriostachya* Mez ocorre na América do Sul, na Argentina, Paraguai, Uruguai e Brasil, nesse último, é registrado na região Centro-Oeste (MT) e Sul (RS) (CANTO-DOROW, 2020; RÚGOLO, 1974); *Panicum pedersenii* Zuloaga ocorre na Argentina, Paraguai e Brasil, onde é registrado na região Nordeste (AL, BA), Centro-Oeste (DF, MT, MS), Sudeste (MG, RJ, SP) e Sul (PR, RS, SC) (GUGLIERI *et al.*, 2004); *Paspalum arundinellum* Mez, previamente conhecida na América do Sul, na Argentina, Paraguai e Brasil, na região Norte (RR), Centro-Oeste (MT, MS) e Sudeste (SP) (FLORA DO BRASIL 2020e; LONGHI-WAGNER *et al.*, 2001; ZULOAGA *et al.*, 2003); *Paspalum cultratum* (Trin.) S. Denham e *P. glaziovii* (A.G. Burm.) S. Denham, ambas endêmicas do Brasil e registradas nas regiões Centro-Oeste (GO) e Sudeste (MG) e na região Centro-Oeste (DF, GO e MT), respectivamente (FLORA DO BRASIL 2020e); *Rhynchachne rottboellioides* Desv. ex Ham., com ocorrência na África tropical, América Central e do Sul, até o Paraguai e sul do Brasil, onde ocorre nas regiões Nordeste (BA, SE), Centro-Oeste (DF, GO, MT, MS), Sudeste (MG, SP) e Sul (PR, RS, SC) (CLAYTON, 1978; FLORA DO BRASIL 2020f; ZULOAGA *et al.* 2003); *Rottboellia cochinchinensis* (Lour.) Clayton, que ocorre no Continente Asiático e Americano; no Brasil, é registrada nas regiões Norte (AM, RR), Centro-Oeste (GO, MT, MS), Sudeste (ES, RJ, SP) e Sul (PR, SC) (FLORA DO BRASIL 2020g; KELLOGG *et al.*, 2020; ZULOAGA *et al.*, 2003); *Saccharum villosum* Steud., com distribuição na América Central e do Sul, no Brasil ocorre nas regiões Nordeste (BA), Centro-Oeste (DF, GO, MS), Sudeste (ES, MG, RJ, SP) e Sul (PR, RS, SC) (WELKER 2020; ZULOAGA *et al.*, 2003); e *Sacciolepis indica* (L.) Chase que é nativa da Ásia e amplamente distribuída na África tropical, Oceania e América, do sudeste do Estados Unidos até Bolívia e Sudeste do Brasil, onde é citada região Nordeste (BA), Sudeste (SP) e Sul (PR, SC) (DE GENNARO 2011; FLORA DO BRASIL 2020h).

Duas espécies encontradas não se enquadram morfologicamente em nenhuma espécie descrita de seus respectivos gêneros: *Arthrostylidium* sp. foi encontrado apenas em uma localidade, em uma mata ciliar no Ramal Principal da REBIONSC; e *Merostachys* sp. foi encontrado em duas localidades (ao lado da entrada do CPBV e em mata ciliar na Fazenda Carrefour, na REBIONSC) e há também uma coleta de 1977 de uma localidade não especificada na porção da Serra no Mato Grosso, que estava erroneamente identificada como *Rhipidocladum parviflorum* (Trin.) McClure no Herbário MG (ambas são descritas no capítulo 2 dessa dissertação).

Trinta espécies foram coletadas em dois ou três habitats, principalmente em área antropizada, campo cerrado e floresta ombrófila aberta. Durante nossas coletas, não conseguimos visitar as fitofisionomias de floresta estacional decidual e floresta estacional semidecidual. Doze espécies não foram coletadas em nossas expedições e suas etiquetas nos materiais em herbários não possuíam informações sobre habitat. Sugerimos que seja realizado um estudo mais aprofundado das fitofisionomias e comunidades vegetais da Serra do Cachimbo, devido à dificuldade de identificação e déficit de conhecimento sobre as espécies que compõe e caracterizam a flora.

A listagem apresentada nesse trabalho possui a maior riqueza de espécies (124) entre os levantamentos florístico-taxonômicos de Poaceae realizado na Amazônia (ROCHA; LINS, 2009; ROCHA *et al.*, 2014; VIANA *et al.*, 2018), que listaram 83, 58 e 87 espécies, respectivamente. No entanto, acreditamos que a diversidade da Serra do Cachimbo esteja subestimada, visto que apenas alguns pontos da área de estudo foram amostrados e que o território da mesma é bastante extenso. A título de exemplificação, somente o CPBV tem uma área correspondente ao estado de Sergipe (FAB, 2021). Além disso, as amostras foram coletadas nos arredores da BR-163, acarretando em áreas sub-coletadas (e.g. leste do CPBV e oeste da REBIONSC) ou que nunca foram acessadas.

O avanço de atividades antrópicas na região, responsável pela crescente eliminação de habitats naturais, é uma ameaça à diversidade florística encontrada na Serra do Cachimbo (MINISTÉRIO DO MEIO AMBIENTE, 2007). Portanto, fazem-se necessários estudos aprofundados na área para elucidar lacunas no conhecimento e fornecer subsídios para políticas ambientais (ICMBIO, 2009).

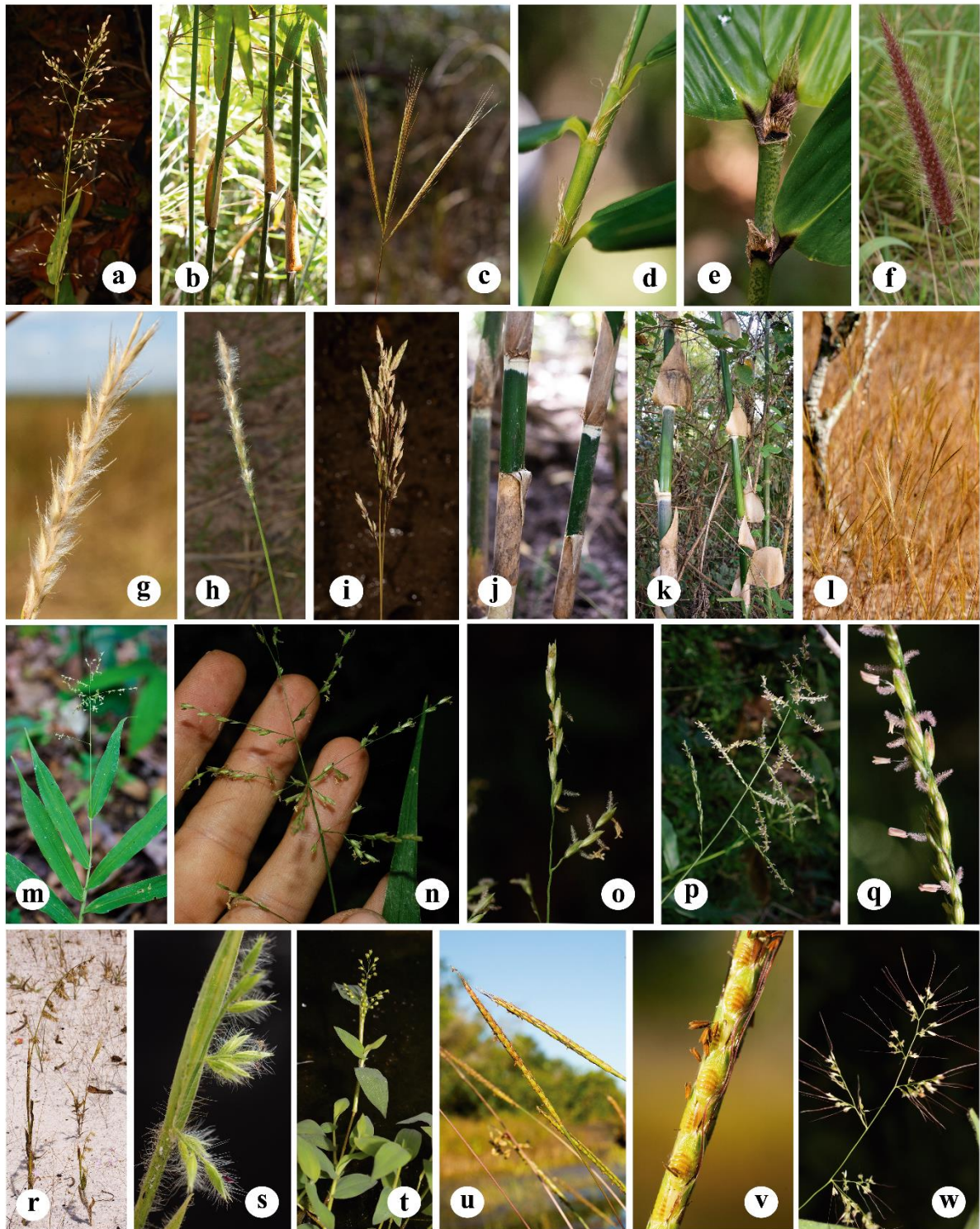


Figura 2 – Registros fotográficos *in situ* das espécies de Poaceae da Serra do Cachimbo. a. *Acroceras zizanioides*. b. *Actinocladum verticillatum*. c. *Aristida longifolia*. d. *Arthrostylidium simpliciusculum*. e. *Arthrostylidium* sp. f. *Cenchrus polystachios*. g. *Elionurus bilinguis*. h. *E. muticus*. i. *Eragrostis pectinacea*. j. *Eremocaulon capitatum*. k. *Guadua paniculata*. l. *Gymnopogon foliosus*. m-o. *Hildaea pallens*. p-q. *H. ruprechtii*. r-s. *Ichnanthus oplismenoides*. t. *Isachne polygonoides*. u-v. *Ischaemum rugosum*. w. *Melinis minutiflora*. Fotos: M. Pastore: a, i, f, t, w; P.L. Viana: b-e, g, j-s, u-v; R.B. Lopes-Neto: h.

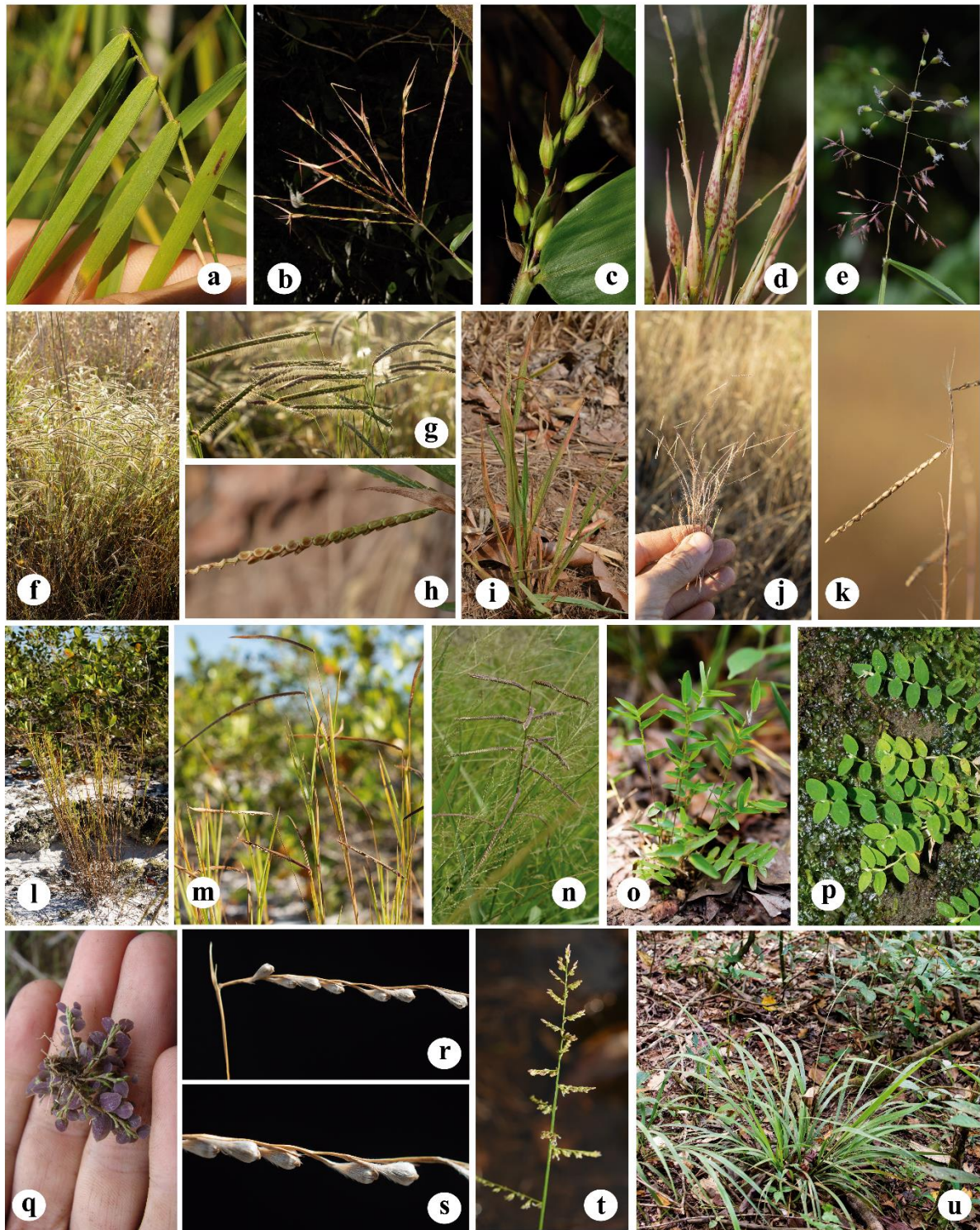


Figura 3 - Registros fotográficos *in situ* das espécies de Poaceae da Serra do Cachimbo. a. *Merostachys* sp. b. *Olyra caudata*. c. *O. latifolia*. d. *O. taquara*, e. *Parodiolyra luetzelburgii* (foto de espécime da Serra de Carajás, Pará). f-g. *Paspalum auricomum*. h-i. *P. foveolatum*. j-k. *P. parviflorum*. l-m. *P. glaziovii*. n. *P. virgatum*. o. *Raddiella esenbeckii*. p. *R. malmeana*. q. *R. minima* (foto de espécime de Canutama, Amazonas). r-s. *Spheneria kegelii*. t. *Steinchisma laxum*. u. *Streptogyna americana*. Fotos: M. Pastore: t, n; P.L. Viana: a-m, o-s, u.

2.4. CONCLUSÃO

A família Poaceae na Serra do Cachimbo possui uma riqueza de espécies alta, quando comparado com outras listagens agrostológicas da Amazônia. A maioria das espécies é pertencente as subfamílias Panicoideae e Bambusoideae, e possuem ocorrência majoritária nas fitofisionomias savânicas e florestais da área, respectivamente. O esforço amostral, apesar de restrito aos arredores da BR-163, revelou treze novas ocorrências para o Estado do Pará e três para o Mato Grosso, além de duas espécies cuja morfologia não se enquadra em seus respectivos gêneros (*Arthrostylidium* e *Merostachys*) e estão sendo estudadas para avaliar se constituem espécies novas para a ciência. Sugerimos que a diversidade da área é subestimada devido a amostragem concentrada aos arredores da BR-163. O crescente avanço de atividades antrópicas constitui um perigo à biodiversidade da região, sendo necessário um estudo aprofundado da região, bem como de suas fitofisionomias, a partir de um maior apoio logístico e recursos humanos. A listagem documentada apresentada fornecerá subsídios para gerência das unidades de proteção que compõe o complexo montanhoso, sendo entregue aos respectivos administradores quando o trabalho for publicado.

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Tabela 1 - Listagem de espécies de Poaceae Barnhart da Serra do Cachimbo, Amazônia Oriental, Brasil. Os triângulos (▲) indicam as espécies registradas pela primeira vez no estado do Pará e os quadrados (■) as novas ocorrências para o Mato Grosso. Os asteriscos (*) indicam as espécies invasoras. Os habitats onde as espécies foram coletadas estão representados em siglas: Área antropizada (AA); Cerradão (CE); Campo cerrado (CC); Campo sujo (CS); Campo limpo (CL); Campo rupestre (CR); Floresta estacional decidual (FED); Floresta estacional semidecidual (FES); e Floresta ombrófila aberta (FOA).

Espécie	Hábitat	Material testemunho
ANOMOCHLOOIDEAE		
<i>Streptochaeta spicata</i> Schrad. ex Nees	?	CHS 22 (NY)
ARISTIDOIDEAE		
<i>Aristida capillacea</i> Lam.	CC	Bringel Jr 336 (CEN); Silva 211 (INPA, MO)
<i>A. longifolia</i> Trin.	CL	Amaral 1025 (INPA, MG, MO); Lopes-Neto 642 (MG)
<i>Aristida</i> sp.	CL	Lopes-Neto 643 (MG); Lopes-Neto 660 (MG)
BAMBUSOIDEAE		
<i>Actinocladum verticillatum</i> (Nees) McClure ex Soderstr.	FOA	Souza 15810 (ESA, HUEFS); Maciel-Silva 507 (MG)
<i>Arthrostylidium simpliciusculum</i> (Pilg.) McClure ▲	FOA	Lopes-Neto 772 (MG); Pastore 1166 (MG)
<i>Arthrostylidium</i> sp.	FOA	Lopes-Neto 682 (MG)
<i>Eremocaulon capitatum</i> (Trin.) Londoño ▲	CC, FOA	Lopes-Neto 683 (MG); Maciel-Silva 478 (MG); Pastore 1133 (MG); Pastore 1175 (MG);
<i>Guadua paniculata</i> Munro	AA, FOA	Lopes-Neto 692 (MG); Lopes-Neto 763 (MG); Pastore 1200 (MG)

<i>Merostachys</i> sp.	AA, FOA	Lopes-Neto 528 (MG); Lopes-Neto 663 (MG); Nascimento 742 (MG)
<i>Olyra caudata</i> Trin	FOA	Amaral 1077 (INPA, MO, NY); Chagas 209 (US); Lopes-Neto 685 (MG); Silva 209 (INPA, MG, MO, US)
<i>O. ecaudata</i> Döll	FOA	Cordeiro 1132 (MG); Nascimento 485 (MG)
<i>O. latifolia</i> L.	CC, FOA	Lopes-Neto 457 (MG); Lopes-Neto 677 (MG); Lopes-Neto 755 (MG); Pastore 1056 (MG); Sasaki 2340 (HERBAM); Sobral 10512 (HUEFS); Sobral 10885 (HUEFS); Zappi 1437 (HERBAM, SPF); Zappi 1443 (HERBAM, NY, SPF); Zappi 920 (HERBAM); Zappi 948 (HERBAM, NY, SPF)
<i>O. taquara</i> Swallen	FOA	Lopes-Neto 638 (MG); Lopes-Neto 669 (MG); Lopes-Neto 681 (MG); Pires 6261 (IAN)
<i>Pariana radiceflora</i> Sagote ex Döll ■	FOA	Pires 6369 (IAN); Sasaki 1745 (HERBAM); Sasaki 2148 (HERBAM)
<i>P. zingiberina</i> Rich. ex Döll ■	FOA	Giacoppini & Córdova 527 (CNMT); Sobral 10476 (HUEFS)
<i>Parodiolyra luetzelburgii</i> (Pilg.) Soderstr. & Zuloaga	FOA	Amaral 805 (INPA, MO, NY, RB)
<i>Raddiella esenbeckii</i> (Steud.) C.E. Calderón & Soderstr.	CC, CR, FOA	Amaral 806 (INPA, MG, MO, RB, US); Lopes-Neto 767 (MG); Silva 1441 (HUEFS); Souza 15805 (ESA); Souza 15861 (ESA); Souza 15767 (ESA, UFMT)

<i>R. malmeana</i> (Ekman) Swallen	FOA	Amaral 1072 (INPA); Lopes-Neto 751 (MG); Lopes-Neto 558 (MG); Lopes-Neto 569 (MG); Silva 196 (INPA)
<i>R. minima</i> Judz. & Zuloaga	CR	Amaral 883 (INPA, MO)
CHLORIDOIDEAE		
<i>Chloris virgata</i> Sw. ▲	AA	Lopes-Neto 773 (MG)
<i>Eleusine indica</i> (L.) Gaertn. *	AA	Pastore 1168 (MG)
<i>Eragrostis bahiensis</i> Schrad. ex Schult.	AA, CR	Lopes-Neto 484 (MG); Lopes-Neto 637 (MG); Lopes-Neto 726 (MG)
<i>E. maypurensis</i> (Kunth) Steud.	AA	Lopes-Neto 633 (MG); Lopes-Neto 680 (MG); Sobral 9885 (BHCB)
<i>E. pectinacea</i> (Michx.) Nees	CC, FOA	Lopes-Neto 466 (MG); Pastore 1171A (MG)
<i>E. pilosa</i> (L.) P. Beauv. *		Pires 6154 (IAN)
<i>E. rufescens</i> Schrad. ex Schult	AA	Lopes-Neto 632 (MG); Lopes-Neto 596 (MG); Maciel-Silva 479 (MG); Pires 6100 (IAN)
<i>Gymnopogon foliosus</i> (Willd.) Nees	AA, CE	Amaral 991 (INPA, MO, NY, RB, UB); Bringel Jr. 327 (CEN); Lopes-Neto 635 (MG); Lopes-Neto 652 (MG); Silva 991 (INPA, MG)
<i>Sporobolus indicus</i> (L.) R. Br. *	AA	Lopes-Neto 567 (MG); Lopes-Neto 592 (MG)
MICRAIROIDEAE		
<i>Isachne polygonoides</i> (Lam.) Döll	AA, FOA	Amaral 1095 (INPA, MG, MO, NY, RB); Amaral 24818 (MG); Lopes-Neto 585 (MG); Lopes-Neto 694 (MG);

Lopes-Neto 748 (MG); Lopes-Neto 769 (MG); Pastore 1193 (MG); Prance 24818 (MO, NY); Silva 195 (INPA)

ORYZOIDEAE

Streptogyna americana C.E. Hubb.

FOA Amaral 1100 (INPA, MO, NY, RB); Lopes-Neto 676 (MG); Zappi 1442 (HERBAM, NY, SPF)

PANICOIDEAE

Acroceras zizanioides (Kunth) Dandy

AA, CC, FOA Lopes-Neto 504 (MG); Lopes-Neto 757 (MG); Maciel-Silva 481 (MG); Schneider 313 (MG)

Andropogon bicornis L.

CL Lopes-Neto 628 (MG); Souza 15848 (ESA, SPF, UFMT)

A. fastigiatus Sw.

AA Lopes-Neto 670 (MG)

A. leucostachyus Kunth

AA, CR Amaral 1123 (INPA, MG, NY, RB); Lopes-Neto 599 (MG); Lopes-Neto 642 (MG); Lopes-Neto 731 (MG); Prance 25305 (MO, NY, RB); Souza 15770 (ESA, SPF, UFMT)

Anthaenantia lanata (Kunth) Benth

? Pereira 1838 (RB); Soares s.n. (RB)

Arundoclaytonia dissimilis Davidse & R.P. Ellis

CC Anderson 10950 (IAN, MO)

Axonopus affinis Chase

CC Maciel-Silva 457 (MG); Schneider 356 (MG)

A. aureus P. Beauv.

CE Anderson 19046 (IAN, MO); Lopes-Neto et al. 644A (MG); Lopes-Neto 662 (MG); Schneider 317 (MG)

A. fissifolius (Raddi) Kuhlman

CL Lopes-Neto 631 (MG); Lopes-Neto 768 (MG)

<i>A. hoehnei</i> G.A. Black	CL	Lopes-Neto 622A (MG); Pires 6131 (IAN); Pires 6460 (IAN, SP)
<i>A. pennellii</i> G.A. Black	?	Pires 6177 (IAN); Pires 6178 (IAN); Pires 6156 (IAN, SP)
<i>A. pressus</i> (Nees ex Steud.) Parodi	CE	Bringel Jr 351 (CEN); Lopes-Neto 622B (MG); Lopes-Neto 624 (MG); Lopes-Neto 644B (MG); Sasaki 2249 (HERBAM); Souza 15854 (ESA, UFMT)
<i>A. siccus</i> (Nees) Kuhlm.	?	Pires 6190 (IAN, SP)
<i>A. surinamensis</i> (Hochst. ex Steud.) Henrard	?	Pires 6135 (IAN); Pires 6445 (IAN)
<i>Cenchrus echinatus</i> L. *	?	Pires 6126 (IAN)
<i>C. polystachios</i> (L.) Morrone *	AA	Lopes-Neto 491 (MG); Lopes-Neto 595A (MG)
<i>Digitaria ciliaris</i> (Retz.) Koeler *	FOA	Pastore 1172 (MG)
<i>D. eriostachya</i> Mez. ▲	CL	Lopes-Neto 620 (MG)
<i>D. fuscescens</i> (J.Presl) Henrard *	CL	Lopes-Neto 627 (MG)
<i>Elionurus bilinguis</i> (Trin.) Hack. ▲	AA, CE, CL	Lopes-Neto 578 (MG); Lopes-Neto 641 (MG); Lopes-Neto 724 (MG)
<i>E. muticus</i> (Spreng.) Kuntze	CS	Lopes-Neto 577 (MG)
<i>Hiladaea breviscrops</i> (Döll) C.Silva & R.P. Oliveira	AA, FOA	Amaral 805 (INPA, MG, MO, NY); Lopes-Neto 537 (MG); Lopes-Neto 687 (MG); Pastore 1155 (MG); Sasaki 2459 (HERBAM); Sobral 10832 (HUEFS)
<i>H. pallens</i> (Sw.) C.Silva & R.P.Oliveira	CC, FOA	Amaral 811 (INPA); Lopes-Neto 674 (MG); Lopes-Neto 734 (MG); Lopes-Neto 758 (MG)

<i>H. ruprechtii</i> (Döll) C. Silva & R.P. Oliveira	FOA	Lopes-Neto 756 (MG); Hemming 22 (IAN); Silva 191 (MO, MG)
<i>H. tenuis</i> (J. Presl & C. Presl) C. Silva & R.P. Oliveira	FOA	Cordeiro 1068 (MG); Lopes-Neto 760 (MG)
<i>Homolepis aturensis</i> (Kunth) Chase	AA, FOA	Lopes-Neto 536 (MG); Lopes-Neto 678 (MG); Lopes-Neto 759 (MG)
<i>Hymenachne donacifolia</i> (Raddi) Chase	AA	Lopes-Neto 747 (MG)
<i>Hyparrhenia rufa</i> (Nees) Stapf	AA	Lopes-Neto 744 (MG)
<i>Ichnanthus calvescens</i> (Nees ex Trin.) Döll	AA	Amaral 1070 (MG, INPA, MO, NY, UB); Lopes-Neto 675 (MG); Lopes-Neto 735 (MG); Lopes-Neto 588 (MG); Sasaki 1661 (HERBAM); Souza 15839 (ESA, RB, UFMT)
<i>I. leptophyllus</i> Döll	AA, CC	Amaral 921 (MO, RB, UB); Lopes-Neto 684 (MG); Pastore 1130 (MG)
<i>I. oplismenoides</i> Munro ex Döll	CE, CL	Lopes-Neto 650 (MG); Lopes-Neto 657 (MG); Silva 125 (INPA)
<i>Ischaemum rugosum</i> Salisb. *	AA	Lopes-Neto 746 (MG)
<i>Lasiacis ligulata</i> Hitchc. & Chase	AA	Amaral 25017 (MG); Lopes-Neto 690 (MG); Prance 25017 (MO, NY, RB)
<i>L. sorghoidea</i> (v.) Hitchc. & Chase	FOA	Lopes-Neto et al. 750 (MG); Silva 124 (INPA, MG, MO, NY, RB)
<i>Loudetia flammida</i> (Trin.) C.E.Hubb.	CL (MT)	Lopes-Neto 695 (MG)
<i>Megathyrsus maximus</i> (Jacq.) B.K.Simon & S.W.L.Jacobs *	AA	Lopes-Neto 593 (MG); Pastore 1195 (MG)

<i>Melinis minutiflora</i> P. Beauv. *	AA, CC	Lopes-Neto 459 (MG); Lopes-Neto 469 (MG); Lopes-Neto 540 (MG); Lopes-Neto 595B (MG); Maciel-Silva 459 (MG)
<i>Mesosetum cayennense</i> Steud.	CE, CR	Lopes-Neto 640 (MG); Lopes-Neto 729 (MG); Sasaki 1974 (HERBAM, SPF)
<i>M. loliiforme</i> (Hochst. ex. Steud.) Chase	CL	Lopes-Neto 663 (MG); Pires 6175 (UB)
<i>Ocellochloa stolonifera</i> (Poir.) Zuloaga & Morrone ■	FOA	Cordeiro 1072 (MG)
<i>Oedochloa procurrens</i> (Nees ex Trin.) C. Silva & R.P. Oliveira	CC	Pires 6354 (IAN); Souza 15807 (ESA, UFMT); Zappi 876 (NY, SPF)
<i>Oplismenus hirtellus</i> (L.) P. Beauv.	AA	Lopes-Neto 686 (MG)
<i>Otachyrium inaequale</i> Pilg.	CR	Lopes-Neto 725 (MG)
<i>O. versicolor</i> (Döll) Henrard	AA	Lopes-Neto 597B (MG); Pires 6105 (IAN); Pires 6216 (IAN, NY)
<i>Panicum cervicatum</i> Chase	CC	Prance 24993 (MG)
<i>P. dichotomiflorum</i> Michx.	AA	Lopes-Neto 764 (MG)
<i>P. ligulare</i> Nees ex Trin.	CC	Pires 6302 (IAN)
<i>P. millegrana</i> Poir.	?	Pires s.n. (IAN)
<i>P. pedersenii</i> Zuloaga ▲	CC	Lopes-Neto 733 (MG)
<i>P. repens</i> L.	FOA	Pastore 1170 (MG)
<i>P. rudgei</i> Roem. & Schult.	AA	Lopes-Neto 634 (MG)
<i>P. sellowii</i> Nees	AA	Lopes-Neto 672 (MG)

<i>Paspalum arenarium</i> Schrad.	CC, CL	Lopes-Neto 621 (MG); Lopes-Neto 630 (MG); Lopes-Neto 742 (MG)
<i>P. arundinellum</i> Mez ▲	AA	Lopes-Neto 743 (MG)
<i>P. auricomum</i> (A.G. Burm.) S. Denham	CR	Hemming 6 (IAN); Lopes-Neto 495 (MG); Lopes-Neto 519 (MG); Lopes-Neto 587 (MG); Lopes-Neto 727 (MG); Pires 6130 (IAN, UB); Pires 6132 (IAN); Pires 6229 (IAN, US); Pires 6356 (IAN, UB); Pires 6549 (IAN, UB); Sasaki 2291 (HERBAM, SPF); Silva 92 (MG)
<i>P. cachimboense</i> Davidse, Morrone & Zuloaga	CR	Coradin 70789 (CEN); Silva 24 (INPA, MG, MO, NY, RB)
<i>P. carinatum</i> Humb. & Bonpl. ex Flügge	?	Pires 6316 (IAN); Pires 6321 (IAN)
<i>P. conjugatum</i> P.J. Bergius *	AA	Lopes-Neto 689 (MG)
<i>P. cultratum</i> (Trin.) S. Denham ▲	FOA	Pires 6327 (IAN)
<i>P. foliforme</i> S. Denham	CE	Lopes-Neto 655 (MG)
<i>P. foveolatum</i> Steud.	AA, CL	Lopes-Neto 629 (MG); Maciel-Silva 482 (MG)
<i>P. glaziovii</i> (A.G.Burm.) S.Denham ▲	CC	Lopes-Neto 740 (MG); Sasaki 2138 (HERBAM, NY)
<i>P. hyalinum</i> Nees ex. Trin.	CC	Lopes-Neto 741 (MG)
<i>P. lanciflorum</i> Trin.	AA, CL	Anderson 10947 (MO, NY); Lopes-Neto 626 (MG); Lopes-Neto 671 (MG); Pires 6134 (IAN, UB)
<i>P. melanospermum</i> Desv. ex Poir.	AA	Lopes-Neto 673 (MG)
<i>P. multicaule</i> Poir	CR	Lopes-Neto 728 (MG)
<i>P. paniculatum</i> L. *	AA	Lopes-Neto 688 (MG)

<i>P. parviflorum</i> Rhode ex Flügge	CR	Lopes-Neto 732 (MG)
<i>P. pilosum</i> Lam.	CC	Lopes-Neto 736 (MG)
<i>P. thrasyoides</i> (Trin.) S. Denham	?	Souza 15840 (ESA, UFMT)
<i>P. virgatum</i> L.	AA	Lopes-Neto 594 (MG); Pastore 1196 (MG); Prance 25304 (UEC, MG, MO, NY, RB)
<i>Rhytachne rottboellioides</i> Desv. ex Ham. ▲	CC	Lopes-Neto 737 (MG)
<i>Rottboellia cochinchinensis</i> (Lour.) Clayton ▲*	AA	Lopes-Neto 749 (MG)
<i>Rugoloa pilosa</i> (Sw.) Zuloaga	AA, FOA	Lopes-Neto 679 (MG); Maciel-Silva 480 9MG); Pastore 1186 (MG); Pires 6136 (IAN); Sobral 98114 (BHCB); Souza 15845 (ESA, UFMT)
<i>R. polygonata</i> (Schrad.) Zuloaga	AA	Lopes-Neto 639 (MG)
<i>Saccharum villosum</i> Steud. ▲	?	Pires 6258 (IAN); Pires 6262 (IAN)
<i>Sacciolepis indica</i> (L.) Chase ▲*	AA	Lopes-Neto 745 (MG)
<i>S. otachyrioides</i> Judz.	CC	Silva 71 (MG)
<i>Schizachyrium brevifolium</i> (Sw.) Nees ex Buse	CC	Amaral 965 (INAP, MG, MO, RB); Silva 66 (MG)
<i>Setaria parviflora</i> (Poir.) Kerguelen *	CC	Cordeiro 1239 (MG)
<i>Spheneria kegelii</i> (Müll. Hal.) Pilg.	CE, CL	Lopes-Neto 619 (MG); Lopes-Neto 653 (MG); Lopes-Neto 659 (MG); Pires 6314 (IAN); Silva 126 (INPA)
<i>Steinchisma hians</i> (Elliot) Nash	?	Pires 6138 (IAN); Pires 6147 (IAN)

<i>S. laxum</i> (Sw.) Zuloaga	AA, CC	Lopes-Neto 473 (MG); Lopes-Neto 546 (MG); Lopes-Neto 618 (MG); Maciel-Silva 488 (MG); Pastore 1169 (MG); Prance 25306 (MO, RB)
<i>S. stenophyllum</i> (Hack.) Zuloaga & Morrone	FOA	Amaral 1086 (INPA, MO); Pastore 1167 (MG); Pastore 1171B (MG); Pastore 1197 (MG); Prance 24905 (INPA, MG, MO, NY); Silva 263 (INPA, MG, MO, RB0)
<i>Trachypogon spicatus</i> (L. f.) Kuntze	CL	Lopes-Neto 623 (MG); Pires 6179 (IAN); Pires 6192 (IAN); Pires 6459 (IAN); Sasaki 1972 (HERBAM, SPF); Sasaki 2137 (ICN, SPF);
<i>Trichantheicum cyanescens</i> (Nees ex Trin.) Zuloaga & Morrone	AA, CC	Lopes-Neto 474 (MG); Lopes-Neto 584A (MG); Lopes-Neto 597A (MG); Lopes-Neto 636 (MG); Lopes-Neto 709 (MG); Lopes-Neto 766 (MG); Pires 6211 (IAN); Prance 25186 (INPA, MG, MO, NY, RB, UEC); Sobral 98083 (BHCB); Zappi 877 (HERBAM, NY, SPF)
<i>T. granuliferum</i> (Kunth) Zuloaga & Morrone	AA, CC	Lopes-Neto 474 (MG); Lopes-Neto 584A (MG)
<i>T. micranthum</i> (Kunth) Zuloaga & Morrone	CC	Lopes-Neto 470 (MG); Pires 6133 (IAN); Pires 6467 (IAN)
<i>T. nervosum</i> (Lam.) Zuloaga & Morrone	?	Pires 6171 (IAN); Pires 6176 (IAN)
<i>T. nutabundum</i> (Zuloaga & Morrone) Zuloaga & Morrone	CC	Lopes-Neto 717 (MG); Lopes-Neto 739 (MG); Pires 6153 (IAN, MO); Pires 6388 (IAN)
<i>T. parvifolium</i> (Lam.) Zuloaga & Morrone	CC, FOA	Amaral 912 (INPA, MO, NY); Pires 6142 (IAN)

<i>T. polycomum</i> (Trinius) Zuloaga & Morrone	CC, CL	Amaral 885 (INPA, MO); Amaral 946 (INPA, NY); Lopes-Neto 625 (MG); Lopes-Neto 701 (MG); Lopes-Neto 720 (MG); Lopes-Neto 738 (MG); Pires 6110 (IAN); Silva 208 (INPA, MG, MO, NY); Sobral 9691 (BHCB)
<i>T. pyrularium</i> (Hitchc. & Chase) Zuloaga & Morrone	AA	Lopes-Neto 765 (MG); Silva 206 (INPA, MG, MO, NY)

3. CAPÍTULO II

NATIVE BAMBOOS (POACEAE: BAMBUSOIDEAE) FROM SERRA DO CACHIMBO, EASTERN AMAZON, BRAZIL

1 Native bamboos (Poaceae, Bambusoideae) from the Serra do Cachimbo, Eastern
2 Amazon, Brazil
3 Bambus nativos (Poaceae, Bambusoideae) da Serra do Cachimbo, Amazônia Oriental,
4 Brasil

5 Raimundo Balieiro LOPES-NETO^{1*}

6 Pedro Lage VIANA¹

7 ¹ Programa de Pós-Graduação em Ciências Biológicas - Botânica Tropical,
8 Universidade Federal Rural da Amazônia / Museu Paraense Emílio Goeldi, CEP:
9 066077-830, Belém, Pará, Brazil

10 * Corresponding author: lopesraimundo10@gmail.com

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20 Native bamboos (Poaceae, Bambusoideae) from the Serra do Cachimbo, Eastern
21 Amazon, Brazil

22 **ABSTRACT**

23 Bambusoideae is the third largest subfamily of Poaceae, they occupy a variety of habitats,
24 but are especially diverse in forests. In the Americas, Brazil is the most diverse country,
25 with species richness concentrated in the Atlantic Forest and the Amazon basin. This
26 work is a floristic-taxonomic treatment of native bamboos from the Serra do Cachimbo,
27 Eastern Amazon, Brazil. Two collection expeditions were carried out in 2019 and 2021,
28 in addition to the analysis of materials from herbaria. Nine genera and sixteen species
29 were found. Descriptions, identification keys, distribution and habitat, taxonomic
30 comments and photographs are provided. The genus with more species is *Olyra* (4),
31 followed by *Raddiella* (3), *Arthrostylidium* (2) and *Pariana* (2); *Actinocladum*,
32 *Eremocaulon*, *Guadua*, *Merostachys* and *Parodiolyra* are represented by one species
33 each. Four species are recorded for the first time in the Pará (*Arthrostylidium*
34 *simpliciusculum* (Pilg.) McClure and *Eremocaulon capitatum* (Trin.) Londoño) and Mato
35 Grosso (*Pariana radicyflora* Sagote x Döll and *Pariana zingiberina* Rich. Ex Döll) states.
36 *Arthrostylidium sp.* and *Merostachys sp.* are new taxa to science.

37 **KEY-WORDS:** Botany, Floristic, Gramineae, Taxonomy

38 **RESUMO**

39 Bambusoideae é a terceira maior subfamília de Poaceae, ocupa vários habitats mas é
40 especialmente diversa em florestas. Nas Américas, o Brasil é o país mais diverso, com
41 espécies concentradas na Mata Atlântica e Amazônia. O presente trabalho apresenta um
42 tratamento florístico-taxonômico dos bambus nativos da Serra do Cachimbo, Amazônia

43 Oriental, Brasil. Foram realizadas duas expedições de coleta em 2019 e 2021, além de
44 análise de materiais provenientes de herbários. Foram encontrados nove gêneros e
45 dezesseis espécies. São apresentadas descrições morfológicas, chaves de identificação,
46 dados de distribuição geográfica e habitat, comentários taxonômicos e fotografias. O
47 gênero com maior riqueza é *Olyra* (4), seguido de *Raddiella* (3), *Arthrostyloidium* (2) e
48 *Pariana* (2), e *Actinocladum*, *Eremocaulon*, *Guadua*, *Merostachys* e *Parodiolyra* são
49 representados por uma espécie cada. Quatro espécies são registradas pela primeira vez
50 nos estados do Pará (*Arthrostyloidium simpliciusculum* (Pilg.) McClure and *Eremocaulon*
51 *capitatum* (Trin.) Londoño) e Mato Grosso (*Pariana radiceflora* Sagote x Döll and
52 *Pariana zingiberina* Rich. Ex Döll). *Arthrostyloidium* sp. e *Merostachys* sp. são novas
53 espécies para ciência.

54 **PALAVRAS-CHAVE:** Botânica, Florística, Gramineae, Taxonomia

55 INTRODUCTION

56 Poaceae Barnhart is one of the largest families of angiosperms, found in all continents
57 (Kellogg 2015). More than 700 genera and 11,500 species are recognized (Soreng *et al.*
58 2017). In Brazil, 232 genera and 1,551 species are registered (Flora do Brasil 2020).

59 The family is monophyletic, strongly supported by anatomic and molecular characters
60 (GPWG 2001; Stevens 2021) and composed of twelve subfamilies (Soreng *et al.* 2017).

61 Bambusoideae Luer. is the third largest subfamily, with 1,441 species distributed in 116
62 genera (Stevens 2021). Three tribes are recognized: Arundinarieae (temperate woody
63 bamboos), Bambuseae (tropical woody bamboos) and Olyreae (tropical herbaceous
64 bamboos) (BPG 2012).

65 Bamboos occupy a variety of habitats, but are especially diverse in forests (BFG 2012).
66 In the Americas, Brazil is the most diverse country, with species concentrated in the
67 Atlantic Forest and the Amazon basin (Judziewicz *et al.* 1999). In the Amazon, lowland
68 moist forests and montane forests below 1,500 m commonly possess a diversity of genera
69 of Olyreae in the understory and several genera of large stature Bambuseae along rivers
70 and streams (Clark *et al.* 2015).

71 However, few taxonomic studies of bamboos have been carried out in the Amazon, most
72 are revisions of genera whose distribution covers the biome (e.g. Hollowell 1987;
73 Soderstrom and Zuloaga 1989; Zuloaga and Judziewicz 1991; Judziewicz 1992;
74 Judziewicz and Clark 1993; Judziewicz 1998; Londoño and Clark 2002). This is due to
75 the historical lack of specialists in the region, as well as to the scarcity of specimens in
76 herbaria, as a result of the peculiar procedures for collecting bamboos (Soderstrom and
77 Young 1983), suggesting the several areas in the Amazon have underestimated diversity.

78 The disparity of knowledge in the Amazon is accentuated in open vegetation areas,
79 mainly those formed by white sand ecosystems, which form a mosaic of communities
80 with a high level of endemism and are threatened by sand extraction, burning and
81 deforestation for agriculture and whose recovery of degraded areas is slow and
82 environmental protection is insufficient (Adeney *et al.* 2016). In ecotone regions, such as
83 the Amazon-Cerrado transition on the border of Pará and Mato Grosso states, this
84 situation is aggravated by the creation of the BR-163 highway, which caused disorderly
85 population growth, illegal mining and erosion and silting of sources of important rivers
86 (ICMBIO 2009; ICMBIO 2018). The objective of this survey was to produce a taxonomic
87 study of native bamboos from Serra do Cachimbo, Eastern Amazon, Brazil.

88 Morphological descriptions of genera and species, identification keys, distribution and
89 habitat data, taxonomic comments and illustrations are provided.

90 MATERIALS AND METHODS

91 Serra do Cachimbo is a mountain complex with elevations between 300 to 700 meters,
92 on the borders of Mato Grosso and Pará States, Brazil. It's a priority area for conservation
93 (MMA, 2007), currently forming a mosaic of protected areas: Reserva Biológica
94 Nascentes da Serra do Cachimbo (REBIONSC) and Campo de Provas Brigadeiro Velloso
95 (CPBV) in Pará and Parque Estadual do Cristalino I and II (PEC I/PEC II) in the Mato
96 Grosso State.

97 Two field collections were carried out in September-October 2019 and May 2021 (figure
98 1). The specimens were collected and herborized following Soderstrom and Young
99 (1983) and deposited in MG. Material from the following herbaria were also analyzed:
100 ESA, CNMT, HERBAM, HUEFS, IAN, INPA, MG, MO, NY, RB and US.

101 Morphological description of genera followed specialized literature: Hollowell (1987),
102 Judziewicz and Clark (1993), Kellogg (2015), Londoño and Judziewicz (1991), Londoño
103 and Clark (2002), McClure (1973), Soderstrom and Londoño (1987), Soderstrom and
104 Zuloaga (1989), Soderstrom (1981), Tutin (1936), Vinicius-Silva et al. (2018) and
105 Zuloaga and Judziewicz (1991). The treatment of *Raddiella minima* Judz. & Zuloaga was
106 mainly made using the original description (Zuloaga and Judziewicz, 1991) due to the
107 lack of additional material.

108 As a result of its location in the Amazon-Cerrado transition, a gradient of forest and
109 savannah formations is observed in the area, in addition to areas of ecological tension and
110 pioneer formations (RADAMBRASIL, 1980). For the habitat classification, we adopted

111 the characterization of RADAMBRASIL (1980): Open ombrophilous forest,
 112 Semideciduous seasonal forest, Deciduous seasonal forest, *Cerradão*, *Campo cerrado*,
 113 *Campo sujo*, *Campo limpo* and we added Anthropized area and *Campo rupestre*, based
 114 on field observations.

115 **RESULTS**

116 A total of 48 specimens of bamboos from Serra do Cachimbo were analyzed and nine
 117 genera and sixteen species were found. The genus with more species is *Olyra* L. (4),
 118 followed by *Raddiella* Swallen (3), *Arthrostylidium* Rupr. (2) and *Pariana* Aubl. (2).
 119 *Actinocladum* McClure ex Soderstr., *Eremocaulon* Soderstr., *Guadua* Kunth,
 120 *Merostachys* Spreng. and *Parodiolyra* Soderstr. & Zuloaga are represented by one species
 121 each. Four species are recorded for the first time in the Pará (*Arthrostylidium*
 122 *simpliciusculum* (Pilg.) McClure and *Eremocaulon capitatum* (Trin.) Londoño) and Mato
 123 Grosso (*Pariana radiceflora* Sagote x Döll and *Pariana zingiberina* Rich. Ex Döll) states.
 124 *Arthrostylidium sp.* and *Merostachys sp.* are new taxa to science.

125 **Identification key to the genera of Bamboos from Serra do Cachimbo, Eastern** 126 **Amazon, Brazil**

- 127 1. Leaves not differentiated into culm leaves and foliage leaves; leaves without an outer
 128 ligule.....2
- 129 1'. Culm leaves and foliage leaves clearly distinct; foliage leaves bearing an outer
 130 ligule.....5
- 131 2. Leaves fimbriate. Synflorescence spiciform, a series of whorls with five staminate
 132 spikelets surrounding a central sessile female spikelet.....*Pariana*

- 133 2'. Leaves not fimbriate. Synflorescence paniculate or racemose.....3
- 134 3. Plants delicate, up to 40 cm tall; culms sprawling or decumbent. Leaf blades small, up to 1.3 cm long, ovate-triangular to elliptic.....*Raddiella*
- 135
- 136 3'. Plants robust, up to 3m tall; culms erect, rarely clambering. Leaf blades 17 – 32 cm long, oval-lanceolate to lanceolate.....4
- 137
- 138 4. Female spikelets 3–4 mm long, pedicels filiform.....*Parodiolyra*
- 139 4'. Female spikelets 7.3–32 mm long, pedicels clavate to subclavate.....*Olyra*
- 140 5. Infra- and supranodal band of white trichomes present on the culms; midrib of foliage leaves prominent.....6
- 141
- 142 5'. Infra- and supranodal band of white trichomes absent on the culms; midrib of foliage leaves not prominent.....7
- 143
- 144 6. Blades of culm leaves reflexed, narrower than the sheath summit. Branch complement without thorns.....*Eremocaulon*
- 145
- 146 6'. Blades of culm leaves erect, confluent with sheath summit. Branch complement with thorns.....*Guadua*
- 147
- 148 7. Branch complement consisting of 3-many branches borne on a promontory; culm leaf blades erect.....*Arthrostylidium*
- 149
- 150 7'. Branch complement apsidate (fan-shaped); culm leaf blades horizontal or reflexed.....8
- 151

152 8. Culm leaves dimorphic, terminal culm leaves (apex of the culm) with blades distinctly
 153 developed in comparison with those of the midculm; culm leaf sheaths with ruffle-like
 154 fused fimbriae persistent.....*Actinocladum*

155 8'. Culm leaves not clearly differentiated along the culm, culm leaf fimbriae not fused,
 156 caducous.....*Merostachys*

157 ***Actinocladum*** McClure ex Soderstr., Amer. J. Bot. 68(9): 1204, f. 1 – 39. 1981. Type
 158 species: *Actinocladum verticillatum* (Nees) McClure ex Soderstr., Amer. J. Bot. 68(9):
 159 1204, f. 1–39. 1981.

160 Cespitose plants. Culms homomorphic, erect, up to 5 m tall, infra- and supranodal bands
 161 of trichomes absent. Branch complement apsidate, without thorns, with branching of two
 162 types; mid-culm branches on the upper nodes, all about equal in length, unbranched; basal
 163 branches on the lowest two or three nodes of the culm, subequal or unequal in length.
 164 Culm leaves and foliage leaves clearly distinct. Culm leaves dimorphic; midculm leaves
 165 with erect and flat blades when young, then patent and concave at maturity, narrower than
 166 the sheath summit, sheath with ruffle-like fused fimbriae at the apex; terminal culm leaves
 167 with convex, often reflexed blades, distinctly developed, sheath puberulent. Foliage
 168 leaves with sheath fimbriate or not, translucent swelling absent, outer ligule present,
 169 blades large, linear-lanceolate, midrib not prominent. Synflorescence terminal, panicles
 170 or raceme, branched, often with secondary branches; spikelets long-pedicelled, bisexual,
 171 glumes 2 (rarely 3), many-flowered, terminal antheridium smaller than the others. Fruit a
 172 caryopsis nuroid, hilum broad-linear.

173 *Actinocladum* is a monospecific genus of woody bamboo, easily recognized by the
 174 dimorphic culm leaves, the midculm leaf sheaths with ruffle-like fused fimbriae at the

175 apex and horizontal and concave blades at maturity, the terminal leaf complement with
176 sheath puberulent and blades convex, often reflexed and distinctly developed (Soderstrom
177 1981). In Brazil, it occurs in the Amazon, Cerrado and Pantanal phytogeographic domains
178 (Andrade *et al.* 2020).

179 *Actinocladum verticillatum* (Nees) McClure ex Soderstr., Amer. J. Bot. 68(9): 1204, f.
180 1–39. 1981. Figure 1. a-d.

181 Rhizomes pachymorph. Culms ca. 5 m tall, 2.5 cm in diameter, erect, internodes 25.6–
182 38.3 cm, pithy, smooth, stramineous; primary buds subequal, prophyll unitary, 5.19–5.92
183 × 1.31 mm, glabrous except in the apex shortly pilose, margins ciliate at the apex; nodes
184 dark brown, glabrous, slightly prominent, horizontal, supranodal ridge inconspicuous.
185 Branch complement with 12–17 branches, ca. 1 mm in diameter, ca. 26 cm long,
186 internodes 8–14 cm long, shorter than the culms. Midculm culm leaves caducous, but the
187 blade falling first; sheath 7.5–7.8 × 3.4–3.6 cm, shorter than the blade, stramineous,
188 glabrous on both surfaces, margins densely ciliate, fimbriae “ruffle-like” in the blade
189 summit; inner ligule ciliate; blades 4 × 0.7–0.9 cm, heart-shaped, stramineous, abaxially
190 shortly pubescent, with dark trichomes in the nerves, adaxially densely ciliate, with
191 hyaline trichomes, margins shortly ciliate, apex acuminate; terminal culm leaf sheath
192 persistent and blade caducous; sheath 3.2–4.5 × 4 cm, stramineous (*in siccus*), puberulent,
193 margins ciliate; auricles inconspicuous; fimbriae ca. 4 mm long; 8–10 overlapping leaves,
194 16–16.5 × 2–2.5 cm, broad lanceolate, convex, often reflexed, glabrous, margins
195 scabridulous, apex acuminate. Foliage leaves 6–8 per complement; sheath 3–4 × 4 cm,
196 stramineous (*in siccus*), glabrous on both surfaces, margins densely ciliate; auricles
197 present, ca. 4 mm long; fimbriae 4.2–5.1 mm, stramineous (*in siccus*); inner ligules ca.
198 0.3 mm long, symmetrical, truncate; outer ligule ca. 0.2 mm long, membranous, shortly

199 ciliate at the apex; pseudopetioles ca. 3.7 mm, flat, glabrous; blades ca. 9.2 × 12.3 cm,
200 linear-lanceolate, glabrous, 49-nerved, midnerve slightly excentric, margins shortly
201 ciliate, apex acuminate. Synflorescence 14.2–15 cm long; pedicels 8–9 cm long,
202 puberulent; subtending bracts ca. 4 × 2 mm, caducous, 9-nerved, glabrous, margins
203 ciliate, apex acuminate. Spikelets 38–40 × 3–4 mm, linear-lanceolate; lower glume 10–
204 12 × 3 mm, ovate-triangular, 5-nerved, stramineous (*in siccus*), glabrous, margins
205 glabrous, apex apiculate; upper glume ca. 9–10 × 2.8–3.2 mm, ovate-triangular, 10-
206 nerved, stramineous (*in siccus*), glabrous, margins glabrous, apex apiculate; rachilla
207 segments short-pilose. Fertile antherium 7-10 per spikelet, 13–15 × 2–3 mm, ovate-
208 lanceolate; lemma 13-nerved, glabrous and scabridulous toward the apex, margins
209 glabrous, overlapping and covering the rachilla segments, apex acuminate; palea 2-
210 keeled, concave between the keels where the rachilla segment fits, 2 broad wings around
211 the floret, 6-nerved between the keels and 5-nerved in each wing, slightly exceeding the
212 lemma, glabrous except the short-ciliate keels, margins glabrous, apex acuminate;
213 lodicules 3, one shorter than the others, deltoid, glabrous, apex pointed; stamens 3,
214 filaments ca. 2 mm long, glabrous, anthers ca. 8 mm long, yellowish (*in siccus*); ovary
215 ca. 2 mm long, fusiform, glabrous, upper portion expanded and short-pubescent, style ca.
216 2 mm long, pubescent, stigma 2. Caryopsis not seen.

217 **Distribution and habitat:** Bolivia and Brazil (Soderstrom 1981; Judziewicz 2000). It's
218 a characteristic species from *Brazilian Cerrado* and occurs in the North region (AM and
219 PA), Northeast (BA), Central-West (DF, MT and MS) and Southeast (MG and SP)
220 (Andrade *et al.* 2020). In the Serra do Cachimbo, this species was found in Open
221 ombrophilous forest.

222 **Examined specimens. BRAZIL. Mato Grosso:** Guarantã do Norte: Estrada guarantã do
 223 norte – cachimbo, ca. 13 km antes da divisa com o estado do Pará, 26 Apr 1997, [st], V.C.
 224 *Souza et al. 15810* (ESA, HUEFS). **Pará:** Altamira: Reserva Biológica Nascentes da
 225 Serra do Cachimbo, Cachoeira do Curuá, 8°44'01.3"S, 54°57'44.1"W, 337m, 30 Sep
 226 2019, [st], *J.F. Maciel-Silva et al. 507* (MG).

227 **Additional specimens examined. BRAZIL. Distrito Federal:** Brasília: Barragem do
 228 lago Paranoá, encostas do morro adjacente à barragem, 16 Oct 1984, [fl], *T.S. Filgueiras*
 229 *1151* (MG).

230 *Actinocladum verticillatum* is an woody bamboo with erect culms, up to 5 m tall; can be
 231 easily recognized by the branch complement in a fan-shaped arrangement (apsidate) and
 232 the culm leaves dimorphic; midculm leaves with sheath glabrous and margins with
 233 fimbriae “ruffle-like” at the apex, the blades heart-shaped, erect and flat when young, then
 234 becoming horizontal and concave at maturity; terminal culm leaf sheath finely puberulent
 235 and bearing 8–10 overlapping leaves, broad lanceolate, convex, often reflex and
 236 positioning downward. The synflorescence is compound by long-pedicelled spikelets, the
 237 pedicels 8–9 cm long, the spikelets ca. 38 × 3 mm, linear-lanceolate.

238 In Serra do Cachimbo, *Merostachys sp.* also possess aspidate branch complement, but
 239 differs by the clambering habit and culm leaves homomorphic, bearing fimbriae not fused
 240 and linear-lanceolate blades.

241 *Arthrostylidium* Rupr., *Bambuseae* 27. 1839. Type species: *Arthrostylidium cubense*
 242 Rupr., *Bambuseae* 28, t. 4, f. 13. 1839.

243 Cespitose plants. Culms homomorphic, generally scandent or clambering, less commonly
 244 erect, up to 15 m tall, infra- and supranodal bands of trichomes absent. Branch

245 complement consisting of 3-many branches borne on a promontory, one branch thicker
 246 than the others, without thorns. Culm leaves and foliage leaves clearly distinct. Culm
 247 leaves with erect blades, confluent with the sheath, sheath fimbriae present, sometimes
 248 absent. Foliage leaves fimbriate, translucent swelling absent, outer ligule present, blades
 249 linear to lanceolate or less commonly elliptical, midrib not prominent. Synflorescence
 250 terminal to leafy, determinate, a spicate raceme lacking bracts, rachis straight, flexuous
 251 or strongly zigzag; spikelets subsessile, bisexual, glumes 1-2. Fruit a basic caryopsis,
 252 hilum long-linear.

253 *Arthrostyidium* is a polyphyletic genus of woody bamboo with thirty-two species in
 254 Central and South America (Kellogg 2015). It's distinguished by the branch complement
 255 on a promontory, with one branch thicker than the others (Judziewicz and Clark 1993).
 256 In Brazil, four species occur in the Amazon (Viana 2020). In the Serra do Cachimbo, it's
 257 represented by two species, of these is a new taxon here described.

258 **Identification key to species of *Arthrostyidium* from Serra do Cachimbo, Eastern**
 259 **Amazon, Brazil.**

260 1. Culm leaf blades 2.5–2.8 cm long, triangular-lanceolate, glabrous, apex aristate, awn
 261 5–6 mm long. Foliage leaf blades 10–14 × 0.5–1 cm, lanceolate, glabrous on both
 262 surfaces.....*Arthrostyidium simpliciusculum*

263 1'. Culm leaf blades 21–24.2 cm long, lanceolate, scabridulous with yellowish trichomes
 264 at the base of adaxial surface, apex acuminate. Foliage leaf blades 25–26 × 4.4–4.8 cm,
 265 broad lanceolate, adaxially glabrous and abaxially shortly pilose with whitish
 266 trichomes.....*Arthrostyidium* sp.

267 *Arthrostylidium simpliciusculum* (Pilg.) McClure, Smithsonian Contr. 9:20. 1973.

268 Figure 1. e-l.

269 Rhizomes pachymorph, necks 2–3 cm long. Culms ca. 5 m tall, 2–3 mm in diameter, erect
270 at first and later scandent, clambering in trees and later pendent, internodes 30.5–37.7 cm
271 long, hollow, scabrous when young, smooth at maturity; primary buds subequal, prophyll
272 unitary, 6.3–8.2 × 2.3–3.8 mm, glabrous, margins ciliate; nodes brown, glabrous, slightly
273 salient, horizontal, supranodal ridge inconspicuous. Branch complement with 15–17
274 subequal, widely spreading branches, ca. 24 cm long, ca. 1 mm in diameter, shorter than
275 the culms. Culm leaves persistent or lately caducous, green when young, stramineous at
276 maturity; sheath 3.4–4.5 × 1–2 cm, confluent with the blade, glabrous on both surfaces,
277 margins densely ciliate, white trichomes; auricles inconspicuous; fimbriae ca. 0.5 mm
278 long, erect, hyaline; inner ligules ca. 0.1 mm long, membranous, shortly ciliate at the
279 apex; blades 2.5–2.8 × 1–2 cm, triangular-lanceolate, glabrous on both surfaces, margins
280 densely ciliate, white trichomes, apex aristate, awn 5–6 mm long. Foliage leaves 4–8 per
281 complement; sheaths 2.3–3.6 × 2 cm, glabrous except minutely pubescent at one margin;
282 auricles absent; fimbriae ca. 5 mm long, straight at the base and sinuous toward the apex,
283 ochraceous; inner ligules ca. 0.1 mm, symmetrical, truncate; outer ligules ca. 0.1 mm,
284 asymmetrical, rim-like form, glabrous; pseudopetioles 1.2–2.2 mm, green, flat, glabrous
285 or shortly pubescent; blades 10–14 × 0.5–1 cm, lanceolate, glabrous on both surfaces,
286 except 1–2 scabrous marginal nerves, 11-nerved, green, the midnerve yellowish, midrib
287 central, base obtuse, margins scabrous, densely scabrous at the apex, apex acuminate.
288 Synflorescence not seen.

289 **Distribution and habitat:** Amazonian species found in Brazil, Colombia, Ecuador and
290 Peru (Judziewicz and Clark 1993). In Brazil, it is registered in the Amazonas (Viana

291 2020) and this is the first record for the Pará State. Occurs in wet lowland forests at
292 elevations from 30 to 300 meters (Judziewicz and Clark 1993). In the Serra do Cachimbo,
293 it was found in Open ombrophilous forest, at the Curuá rivers margins.

294 **Examined specimens. BRAZIL. Pará:** Altamira: Reserva Biológica Nascentes da Serra
295 do Cachimbo, Cachoeira do Curuá, ca. 400 m da BR 163, 8°44'08.3"S, 54°57'43.6"W,
296 368m, 30 Sep 2019, [st], *M. Pastore et al. 1166* (MG); *ibid.*, 28 May 2021, [st], *R.B.*
297 *Lopes-Neto et al. 772* (MG).

298 *Arthrostylidium simpliciusculum* is the only species of the genus with the lemma
299 midnerve prolonged into a scabrous awn 1.5–3(5) mm long (Judziewicz and Clark 1993).
300 It can be recognized by the combination of vegetative morphological characters: habitat
301 erect at first and later scandent, clambering in trees and later pendent; culm leaf margins
302 ciliate, with whitish trichomes, summit few fimbriate, ca. 0.5 mm long, blades triangular-
303 lanceolate, apex aristate, awn 5–6 mm long; foliage leaf sheath glabrous except minutely
304 pubescent at one margin, fimbriae ca. 5 mm long, ochraceous, blades 10–14 × 0.5–1 cm,
305 lanceolate, glabrous on both surfaces, except 1–2 scabrous marginal nerves. To
306 distinguish from *Arthrostylidium sp.*, see comments of this species.

307 *Arthrostylidium sp.* Figure 3. a-g.

308 Rhizomes pachymorph, necks 2–4.5 cm long. Culms 5–6 m long, 4–6 mm in diameter,
309 erect at the base, leaning in the vegetation on the upper portion, internodes 42–49 cm
310 long, fistulous with several membranous delicate septa in the lumen, smooth, glabrous;
311 primary buds not seen; prophyll unitary, 6.3–8.2 × 2.3–3.8 mm, sparsely pilose, margins
312 ciliate, caducous; nodes black, glabrous, nodal line horizontal, supranodal ridge
313 inconspicuous. Branch complement with primary branch 42–60 cm long, secondary

314 branches smaller, 22–28 cm long, smooth, glabrous. Culm leaves persistent; sheath 8.9–
315 10×1.3 – 1.5 cm, confluent and shorter than the blade, light green with dark green stains,
316 stramineous *in siccus* on both surfaces or sometimes pinkish in the abaxial surface,
317 glabrous, 2 lateral margins shortly pilose on both sides, black trichomes, margins
318 scabridulous; auricles inconspicuous, ca. 0.5 mm long; fimbriae ca. 6 mm long, curvy,
319 stramineous (*in siccus*); inner ligules ca. 1 mm long, membranous, shortly ciliate at the
320 apex; blades 21 – 24.2×1.5 – 2 cm, lanceolate, stramineous on both surfaces or sometimes
321 pinkish in the abaxial surface, occasionally with black spots toward the apex in the adaxial
322 surface, sparsely scabridulous with yellowish trichomes at the base of adaxial surface,
323 abaxial surface glabrous, margins glabrous, apex acuminate. Foliage leaves (4-)7–9 per
324 complement; sheaths 4 – 4.5×1 cm, light green with dark green stains, glabrous, margins
325 glabrous except in one upper margin ciliate; auricles present, equal on both sides, ca. 2
326 mm; fimbriae 9–11 mm long, straight at the base and sinuous toward the apex,
327 ochraceous, shiny; inner ligules ca. 0.2 mm, symmetrical, truncate, membranous, shortly
328 ciliate at the apex; outer ligules ca. 0.2 mm, symmetrical, membranous; pseudopetioles
329 ca. 4 mm, yellowish to dark brown, flat, glabrous; blades 25 – 26×4.4 – 4.8 cm, broad
330 lanceolate, glabrous on the adaxial surface and shortly pilose with whitish trichomes in
331 the abaxial surface, nerves green, the midnerve yellowish, midrib central, base obtuse,
332 asymmetrical, margins glabrous to scabridulous toward the apex, apex acuminate.
333 Synflorescence not seen.

334 **Distribution and habitat:** This species was only collected in one locality, in a riparian
335 open ombrophilous forest (*mata ciliar*) at the headwaters of Curuá River in REBIONSC.

336 **Examined specimens. BRAZIL. Pará:** Altamira, Reserva Biológica Nascentes da Serra

337 do Cachimbo, Ramal principal da REBIONSC, mata ciliar, 9°04'26.6"S, 54°45'18.3"W,
338 589m, 25 May 2021, [st], R.B. Lopes-Neto et al. 682 (MG).

339 *Athrostylidium* sp. and *A. grandifolium* Judz. & L.G. Clark (species only known from
340 type collection in southwestern Pará) exhibit the largest foliage leaf blades of the genus
341 (20–26 × 4.4–7 cm), these broad lanceolate, with base obtuse and apex acuminate.
342 However, the new species can be distinguished by the foliage leaf inner ligule
343 symmetrical, ca. 0.2 mm long, auricles equal on both sides, ca. 2 mm long and fimbriae
344 9–11 mm long, straight at the base and sinuous toward the apex, ochraceous and shiny,
345 while *A. grandifolium* possess inner ligule elongate on side opposite auricle, 6–10 mm
346 long, sheath summit on one side prolonged into an auricle up to 5 mm long and fimbriae
347 apparently absent.

348 It differs from the others co-generics registered in Brazil by the nodal line inconspicuous
349 (Vs. expanded in a downward shield-like corky structure in *A. scandens* McClure), nodal
350 fimbriae absent (Vs. a uniform band of abundant whitish-yellow cilia up to 5 mm long in
351 *A. fimbrinodum* Judziewicz & L.G. Clark) and culm leaf blades 21–24.2 cm long,
352 lanceolate, sparsely scabridulous with yellowish trichomes at the base of adaxial surface,
353 abaxial surface glabrous and apex acuminate (Vs. culm leaf blades 2.5–2.8 cm long,
354 triangular-lanceolate, glabrous on both surfaces and apex aristate, awn 5–6 mm long in
355 *A. simpliciusculum*). The latter is also registered in Serra do Cachimbo and can also be
356 distinguished by the foliage leaf blades 10–14 × 0.5–1 cm, lanceolate and glabrous on
357 both surfaces (Vs. foliage leaf blades 25–26 × 4.4–4.8 cm, broad lanceolate, adaxially
358 glabrous and abaxially shortly pilose with whitish trichomes).

359 *Eremocaulon* Soderstr. & Londoño, Amer. J. Bot. 74(1): 37. 1987. Type species:

360 *Eremocaulon aureofimbriatum* Soderstr. & Londoño, Amer. J. Bot. 74(1): 37, f. 3. 1987.

361 Cespitose plants. Culms homomorphic, erect below, arching and clambering above, often

362 supported by trees, up to 20 m tall, infra- and supranodal bands of trichomes usually

363 absent (present in *E. capitatum*). Branch complement with one dominant and smaller

364 secondary branches, without thorns. Culm leaves and foliage leaves clearly distinct. Culm

365 leaves with erect blades, narrower than the sheath summit, sheath fimbriae present.

366 Foliage leaves with sheath fimbriate or not, translucent swelling absent, outer ligule

367 present, blades narrowly triangular, ovate-lanceolate or linear-lanceolate, midrib

368 prominent. Synflorescence terminal to leafy, indeterminate, 1–15 pseudospikelets per

369 coflorescence, coflorescences either with one to few pseudospikelets and open or with

370 several to many pseudospikelets and congested to capitate, each coflorescence and

371 paraclade or pseudospikelet with one subtending bract; pseudospikelets bisexual, glumes

372 absent, comprising 1 prohyll, 0–4 gemmiparous bracts, with 1–17 fertile antheridium and

373 1–4 terminal rudimentary antheridium. Fruit a basic caryopsis, hilum linear, as long as the

374 caryopsis.

375 *Eremocaulon* is a woody bamboo genus endemic to Brazil (Londoño and Clark 2002;

376 Kellogg 2015; Jesus-Costa et al. 2018). It's characterized by its branch complement with

377 one dominant and smaller secondary branches, without thorns, infra- and supranodal

378 bands of trichomes absent (present in *E. capitatum*), culm leaves with reflexed blades,

379 narrower than the sheath, foliage leaves with midrib prominent and synflorescence

380 compound by pseudospikelets (Londoño and Clark 2002). The genus has five species in

381 Amazon, Cerrado and Mata Atlântica (Lopes-Neto et al. 2020). In the Serra do Cachimbo,

382 it's represented by one species.

383 *Eremocaulon capitatum* (Trin.) Londoño, Syst. Bot. 27(4): 714-716. 2002. Figure 4. a-j.
384 Rhizomes pachymorph, necks 2–4 cm long. Culms 5–8 m tall, 1.2–3.4 cm in diameter,
385 internodes 15–46.6 cm long, with a soft central pith when young, solid when old,
386 glabrescent, dark green, infranodal bands of white trichomes 0.5–0.6 cm long, supranodal
387 bands 1.5–2 cm long, both with adpressed, silky and wavy short trichomes; nodes dark
388 brown, glabrous, horizontal, inconspicuous, supranodal ridge inconspicuous. Branch
389 complement with 4–8 secondary branches at its base, dominant branch at 45° angle, 0.5–
390 1 m long. Culm leaves long-persistent; sheath 11–15 × 6–6.7 cm, longer than the blade,
391 ochraceous or stramineous, with pinkish spots, adaxially glabrous, abaxially glabrescent,
392 with silky adpressed trichomes, margins densely ciliate, the cilia rubbing off easily;
393 auricles 0.4–0.6 cm, brown, fimbriae 1.6–2.2 cm long, golden, scabrid, with silky
394 adpressed trichomes, apex narrower and brittle; inner ligules 0.6–1 mm, membranous;
395 blades 10.2–10.4 × 0.6–1.6 cm, ovate-lanceolate, stramineous, abaxially densely
396 pubescent, with silky trichomes, adaxially waxy, glabrescent, with golden trichomes,
397 margins fimbriate to ciliate, apex acuminate. Foliage leaves 6–9 per complement; sheath
398 4–6 × 4 cm, green, hispidulous, with silky wavy trichomes, overlapping margins smooth,
399 underlapping margins densely ciliate; auricles present, ca. 0.5 cm long, tongue-shaped,
400 red to brownish, fimbriae ca. 0.2 cm long, stramineous (*in siccus*); inner ligules ca. 0.6–
401 0.7 cm, symmetrical, truncate; outer ligules 0.14–0.18 cm, asymmetrical, rim-like shaped,
402 hispidulous, with silky erect trichomes, margins ciliate; pseudopetioles 1–2 cm, flat,
403 glabrous; blades 15–33 × 4.5–15 cm, linear-lanceolate, green, glabrous on both surfaces
404 or sparsely hairy on the abaxial surface, 11–13 conspicuous nerves, yellowish, midrib
405 strongly excentric, 5–7 nerves on one side and 4–5 on the other side, margins scabrous,
406 apex acuminate. Synflorescence 34.5–42 cm long (primary branches), with 6 capitate

407 coflorescences, each coflorescence with 6–8 pseudospikelets, main axis pubescent
408 basally and apically, glabrous in the middle portion; subtending bracts ca. 13×4 mm,
409 lately caducous, ovate-lanceolate, stramineous (*in siccus*), abaxially glabrous, adaxially
410 pubescent toward the apex, overlapping margins ciliate, apex acute. Pseudospikelets 12–
411 13×1.8 –3 mm, ovate-lanceolate to linear-lanceolate, comprising 1 prophyll, 3
412 gemmiparous bracts, 1 sterile lemma, 1–3 fertile anthercia; prophyll not seen;
413 gemmiparous bracts 2 –4 \times 0.5–4 mm, the apical ones larger than the basal ones,
414 triangular, 10-nerved, stramineous (*in siccus*), overlapping margins ciliate, apex acute or
415 shortly mucronate; sterile lemma 8–10 \times 3–4 mm, ovate-lanceolate, 18-nerved,
416 stramineous (*in siccus*), glabrous, toward the apex, margins glabrous, apex acute; rachilla
417 internodes between the fertile anthercia ca. 1.5 mm long, pubescent, straight. Fertile
418 anthercium ca. 9–10 \times 1–2 mm, ovate-lanceolate, stramineous (*in siccus*); lemma 14–19-
419 nerved, abaxially waxy, glabrous, adaxially glabrous except pubescent at the tip, with
420 adpressed transparent trichomes, overlapping margins glabrous or ciliolate, apex
421 mucronate, ca. 0.5 mm long; palea 12–18-nerved, the wings of the palea keels exceeding
422 the margins of the lemma, enfolding margins glabrous except apically puberulous and
423 waxy, apex bifid; lodicules 3, ca. 2×1 mm, deltoid, concave, nerves brownish (*in siccus*),
424 apex rounded; stamens 6, filaments ca. 1 mm long, pubescent, anthers ca. 8 mm long,
425 yellowish (*in siccus*); ovary ca. 1 mm long, elliptic, apically hispidulous, style ca. 3 mm
426 long, hispidulous, stigmas 2. Caryopsis not seen.

427 **Distribution and habitat:** Brazilian Central Planalto, in the States of Goiás, Mato Grosso
428 and Mato Grosso do Sul (Londoño and Clark 2002). This is the first record for the State
429 of Pará. Occur in gallery forests and *mata ciliar* in sandy soils, at 300 to 900 meters
430 (Londoño and Clark 2002). In Serra do Cachimbo, this species was found in *mata ciliar*

431 of *Cerradão* and Open ombrophilous forest, in the margins of the Braço Norte (CPBV)
 432 and Curuá (REBIONSC) rivers.

433 **Examined specimens. BRAZIL. Pará:** Altamira, Reserva Biológica Nascentes da Serra
 434 do Cachimbo, Cachoeira do Curuá, ca. 400 m da BR 163 - Santarém-Cuiabá, 8°44'08.3"S,
 435 54°57'43.6"W, 368m, 30 Sep 2019, [st], *M. Pastore et al.* 1175 (MG); Ponte sobre Rio
 436 Curuá, 9°04'15.8"S, 54°46'27.7"W, 28 Sep 2019, [st], *J.F. Maciel-Silva et al.* 478 (MG);
 437 Ramal principal da REBIONSC, entrada a 65km ao sul de Cachoeira da Serra,
 438 9°04'26.6"S, 54°45'18.3"W, 589m, 25 May 2021, [fl], *R.B. Lopes-Neto et al.* 683 (MG).
 439 Novo Progresso: Campo de Provas Brigadeiro Velloso, Rio Braço Norte, cerca de 600 m
 440 a norte da ponte, 9°21'16.6"S, 54°54'17.0"W, 465m, 26 Sep 2019, [st], *M. Pastore et al.*
 441 1133 (MG).

442 *Eremocaulon capitatum* is distinguished from its co-generics by the culms 5–8 m tall, the
 443 presence of an infra- and supranodal bands of white trichomes, culm leaf sheaths
 444 abaxially glabrescent, margins densely ciliate, and midrib of the foliage leaves strongly
 445 excentric. It's morphologically related with *E. amazonicum* Londoño (Western Amazon),
 446 which also has pinkish spots in culm leaves, but differs in the smaller culms (3–6 m tall),
 447 the absence of an infra- and supranodal band of trichomes, culm leaves sheaths pubescent
 448 abaxially, smooth at the margins and midrib of the foliage leaves slightly excentric
 449 (Londoño and Clark, 2002).

450 In Serra do Cachimbo, it differs from *Guadua paniculata* Munro, which also has of an
 451 infra- and supranodal bands of white trichomes on the culms, by the branch complement
 452 without thorns (Vs. bearing thorns), persistent culm leaves, with blades reflexed, 10.2–
 453 10.4 × 0.6–1.6 cm, ovate-lanceolate (Vs. caducous culm leaves, blades erect, 9.5–11 × 7–

454 7.5 cm, triangular) and synflorescence composed of 6 capitate coflorescences,
455 pseudospikelets 12–13 × 1.8–3 mm and palea with enfolding margins glabrous except
456 apically puberulous and waxy (Vs. 4–8 paniculate coflorescences, pseudospikelets ca. 26
457 × 4 mm and palea margins glabrous).

458 *Guadua* Kunth, J. Phys. Chim. Hist. Nat. Arts 95: 150. 1822. Type species: *Guadua*
459 *angustifolia* Kunth, Syn. Pl. 1: 253. 1822.

460 Cespitose plants. Culms homomorphic, arborescent to scandent, up to 30 m tall, infra-
461 and supranodal bands of trichomes present. Branch complement with one dominant and
462 smaller secondary branches, with thorns. Culm leaves and foliage leaves clearly distinct.
463 Culm leaves with erect blades, confluent with the sheath summit, sheath fimbriae present,
464 sometimes absent. Foliage leaves with sheath fimbriate, translucent swelling absent, outer
465 ligule present, blades elliptic, lanceolate, linear, oblong, ovate or triangular, midrib
466 prominent. Synflorescence terminal, indeterminate, with several pseudospikelets in
467 sparsely or densely crowded aggregations; pseudospikelets bisexual, glumes 0 to several,
468 comprising 1 subtending bract, 1 prophyll, 1–several gemmiparous bracts, with several
469 fertile anthercium and one rudimental anthercium. Fruit a basic caryopsis, rarely baccate.

470 *Guadua* is a woody bamboo, mainly characterized by its branch complement with one
471 dominant and smaller secondary branches, with thorns, infra- and supranodal bands of
472 trichomes present, culm leaves with erect blades, confluent with the sheath summit,
473 foliage leaves with midrib prominent and synflorescence compound by pseudospikelets
474 (McClure 1973; Soderstrom and Londoño, 1987). The genus has twenty-six species in
475 Central and South America (Kellogg 2015). In Brazil, twenty-one species occur in

476 Amazon, Cerrado, Mata Atlântica and Pampas (Shirasuna *et al.* 2020). In the Serra do
477 Cachimbo, it's represented by one species.

478 *Guadua paniculata* Munro, Trans. Linn. Soc. London 26(1): 85. 1868. Figure 5. a-j.

479 Rhizomes not seen. Culms 5–12 m long, 1.5–2.2 cm in diameter, internodes 22–34.6 cm
480 long, hollow or pithy in center, thick walls, ca. 3 mm, smooth, glabrous except infra- and
481 supranodal bands, light green, infranodal bands 4–7 cm long, supranodal bands 0.9–1.2
482 cm long, both with adpressed, white short trichomes; nodes stramineous, nodal line
483 horizontal, supranodal ridge slightly conspicuous. Branch complement with 4–16
484 secondary branches at its base, dominant branch at 45° angle, ca. 32 cm long, ca. 6 mm
485 in diameter, internodes 4–8.5 cm long, glabrous, secondary branches ca. 16 cm long, ca.
486 0.5 mm in diameter, internodes ca. 4.1–4.7 cm long, short-pilose, shorter than the culms.
487 Culm leaves caducous, but the blade falling first; sheath ca. 21–29.1 cm, longer than the
488 blade, stramineous, abaxially glabrous, adaxially sparsely pubescent, with retrorse
489 trichomes on both surfaces, margins glabrous; auricles absent or inconspicuous, ca. 0.2
490 mm; fimbriae ca. 4 mm long; inner ligules ca. 0.2 mm long, membranous; blades 9.5–11
491 × 7–7.5 cm, triangular, stramineous, abaxially glabrous, adaxially pubescent between
492 nerves, densely pubescent at the base, margins ciliate, basal with fimbriae ca. 4 mm long,
493 apex acute. Foliage leaves 6–13 per complement; sheath 4.3–6.7 × 4 cm, green, glabrous
494 to short-pilose, overlapping margins glabrous, underlapping margins ciliate; auricles
495 absent, when present, 5–6 mm, stramineous (*in siccus*), fimbriae 4–5 mm, stramineous
496 (*in siccus*); inner ligules ca. 0.3 mm, membranous, symmetrical; outer ligules ca. 0.1 mm,
497 membranous-ciliate, symmetrical; pseudopetioles ca. 0.6 mm, flat, glabrous; blades 15.5–
498 17.5 × 0.8–1.4 cm, linear-lanceolate, green, short pilose on both surfaces, 12–15-nerved,
499 yellowish, slightly excentric, 5–7 nerves on one side and 6–8 on the other side, margins

500 scabridulous, apex acuminate. Synflorescence 30–58 cm long, paniculate, lax, 4–8
501 coflorescences, 3–8 pseudospikelets per coflorescence, main axes pubescent; subtending
502 bracts ca. 2.2×0.8 mm, persistent, triangular, short-pubescent, margins ciliate, densely
503 toward the apex, apex acute. Pseudospikelets $26\text{--}30 \times 3.5\text{--}4$ mm, linear-lanceolate;
504 prophylls $3\text{--}4 \times 1\text{--}1.2$ mm, symmetrical, triangular, glabrous, margins glabrous, apex
505 acute; gemmiparous bracts ca. $4\text{--}5 \times 2$ mm, triangular, 10-nerved, glabrous, margins
506 ciliate, apex acuminate; rachilla internodes between the fertile antherium ca. 2 mm long,
507 short-ciliate, straight. Fertile antherium $4\text{--}6.7 \times 1.8$ mm, lanceolate; lemma 12-nerved,
508 glabrous, margins ciliate, apex acuminate; palea 2-keeled, concave between the keels
509 where the rachilla segment fits, 2 inconspicuous wings around the floret, 5-nerved
510 between the keels and 2-nerved in each wing, glabrous except the short-ciliate keels,
511 margins glabrous, apex acute; lodicules not seen; stamens 3, filaments ca. 2 mm long,
512 glabrous, anthers ca. 5 mm long, yellow (*in siccus*); ovary ca. 0.5×1 mm, umbonate,
513 short-pilose toward the apex, style ca. 1.5 mm long, stigma 2. Caryopsis not seen.

514 **Distribution and habitat:** Mexico to South America (Bolivia, Paraguay and Brazil), in
515 humid to seasonally dry habitats bellow 1.000 meters (Londoño and Clark 1991). In
516 Brazil, can be found in Amazon, Cerrado and Mata Atlântica phytogeographic domains,
517 in the North (AC, PA and TO), Northeast (AL, BA, PE, PI, RN and SE), Central-West
518 (DF, GO, MT and MS), Southeast (ES, MG and SP) and South regions (RS and SC)
519 (Shirasuna *et al.* 2020). In the Serra do Cachimbo, this species was found in Anthropized
520 area and Open ombrophilous forest.

521 **Examined specimens. BRAZIL. Pará:** Altamira: BR-163, borda da estrada, a 49km ao
522 sul de Cachoeira da Serra, $8^{\circ}59'41.3''\text{S}$, $54^{\circ}58'31.6''\text{W}$, 491m, 25 May 2021, [st], R.B.
523 *Lopes-Neto* 692 (MG); Reserva Biológica Nascentes da Serra do Cachimbo, Cachoeira

524 do Curuá, ca. 600 m da BR 163 - Santarém-Cuiabá, 8°44'01.0"S, 54°57'42.8"W, 333m,
 525 30 Sep 2019, [st], *M. Pastore et al. 1200* (MG); idib., 8°44'04"S, 54°57'42.8"W, 350m,
 526 27 May 2021, [st], *R.B. Lopes-Neto et al. 763* (MG).

527 **Additional specimens examined. BRAZIL. Mato Grosso do Sul:** Porto Murtinho:
 528 Fazenda Alto Salobra, próximo aos limites do PARNA da Serra da Bodoquena, estrada
 529 p/ Fazenda Califórnia, 20°55'15"S, 56°40'33"W, 03 Dec 2016, [fl], *G. Martinelli et al.*
 530 *16880* (MG).

531 *Guadua paniculata* is a polymorphic and poorly known species (Londoño and Judziewicz
 532 1991). It can be distinguished from other bamboos from Serra do Cachimbo by the
 533 following combination of vegetative morphological characters: scandent culms, 5-12 m
 534 long, infra- and supranodal bands of white trichomes present, branch complement with
 535 thorns and caducous culm leaves, the blades falling first, the blades erect and triangular.
 536 To distinguish it from *E. capitatum*, see comments of this species.

537 ***Merostachys*** Spreng., Syst. Veg. [Sprengel] 1: 132, 249. 1825[1824]. Type species:
 538 *Merostachys speciosa* Spreng., Syst. Veg. [Sprengel] 1: 249, f. 37b-n. 1825[1824].

539 Cespitose plants. Culms homomorphic, scandent at maturity, often drooping from trees,
 540 infra- and supranodal bands of trichomes absent or present. Branch complement aspidate,
 541 few to many branches, sometimes branches branched, without thorns. Culm leaves and
 542 foliage leaves clearly distinct. Culm leaves with reflex blades, narrower than the sheath
 543 summit, sheath fimbriae present, not fused. Foliage leaves with sheath fimbriate or not,
 544 translucent swelling absent, outer ligule present, blades large, lanceolate or ovate-
 545 lanceolate, midrib not prominent. Synflorescence a terminal raceme, pectinate; spikelets

546 sessile or on short pedicels, bisexual, glumes 2, with rudimental antheridium at the apex of
547 rachilla extension. Fruit a nuroid caryopsis, hilum conspicuous or not.

548 *Merostachys* is a scandent woody bamboo genus with branch complement composed of
549 a few to many subequal branches in a fan-shaped arrangement (aspidate), sometimes with
550 secondary branches, culm leaves with reflexed blades, narrower than the sheath summit,
551 sheath fimbriae present, usually not fused, foliage leaves with midrib not prominent,
552 synflorescence terminal and racemose, pectinate and caryopsis nuroid (McClure 1973;
553 Vinicius-Silva et al. 2018). The genus has 54 species in Central and South America
554 (Kellogg 2015; Vinicius-Silva et al. 2018). In Brazil, 47 species occur in Amazon,
555 Cerrado and Mata Atlântica domains (Vinicius-Silva et al. 2020). In the Serra do
556 Cachimbo, it's represented by one species, a new taxon here described.

557 *Merostachys* sp. Figure 6. a-i.

558 Rhizomes pachymorph, short-necks, 0.6–1.2 cm long. Culms 6–9 m tall, 0.2–0.3 cm in
559 diameter, initially erect then clambering on surrounding vegetation, basal internodes
560 15.3–15.9 cm long, middle internodes 15.2–20 cm long, pithy in center, glabrous to
561 scabrous toward the apex, with short yellow trichomes (*in siccus*), infranodal bands of
562 trichomes absent; primary buds subequal, unitary, ca. 1.83 x 1.84 mm, covered by short
563 white trichomes (*in siccus*), margins free, densely pilose; nodes dark brown, glabrescent,
564 nodal line horizontal, supranodal ridge inconspicuous. Branch complement with 20–55
565 subequal branches, 10–11 cm long, 0.3–0.5 mm in diameter, internodes 4–5 cm long,
566 glabrous, secondary branches absent, all branches thinner than the culm. Culm leaves
567 caducous; sheath 10–12 cm long, longer than the blade, coriaceous, stramineous (*in*
568 *siccus*), adaxially glabrous, abaxially scabrous, margins scabridulous; auricles

569 inconspicuous; fimbriae ca. 5 mm long, straight at the base and sinuous toward the apex,
570 stramineous (*in siccus*); inner ligules ca. 0.1 mm long, membranous, shortly ciliate at the
571 apex; blades 3.8–6.5 × 0.2–0.3 cm, L:W 12.6–21.6, linear-lanceolate, stramineous (*in*
572 *siccus*), glabrous on both surfaces, margins scabridulous, apex acuminate. Foliage leaves
573 8–10 per complement; sheaths 1.4–1.6 × 0.2–0.3 cm, glabrous, overlapping and
574 underlapping margins densely ciliate; auricles absent; fimbriae 4–5 mm long, straight at
575 the base and sinuous toward the apex, yellow-white; inner ligules 0.2–0.3 mm,
576 membranous, symmetrical, truncate; outer ligules ca. 1 mm, membranous, shortly ciliate
577 at the apex, symmetrical, with an inconspicuous rim at the center, glabrous;
578 pseudopetioles ca. 1 mm long, stramineous (*in siccus*), flat, densely pilose; blades 3.7–
579 4.7 × 0.3–0.4 cm, strongly reflexed, linear-lanceolate, glabrous on both surfaces,
580 sometimes scabrous at the base of abaxial surface, adaxially with 2–3 lateral nerves on
581 one side prominent and scabrous, when 3, the lateral ones more prominent than the middle
582 one, 27–29-nerved, green, the midnerve yellowish, midnerve slightly excentric, base
583 rounded, slightly asymmetrical, margins scabrous, apex attenuate. Synflorescence not
584 seen.

585 **Distribution and habitat:** This species is known from three locations in Serra do
586 Cachimbo. In the Pará State, was found in Anthropized area and Open ombrofilous forest,
587 in humid soil near streams.

588 **Examined specimens. BRAZIL. Mato Grosso:** Ponto 23. F. sc zb., 12 Nov 1976, [st],
589 *O.C. do Nascimento* 742 (MG). **Pará:** Altamira: BR-163, lado direito da entrada do
590 Campo de Provas Brigadeiro Velloso, 9°22'15.3"S, 54°51'27"W, 513m, 26 May 2021,
591 [st], *R.B. Lopes-Neto et al.* 693 (MG); Reserva Biológica Nascentes da Serra do

592 Cachimbo, BR-163, Acesso pela Fazenda Carrefour, trilha de mata ciliar do rio São
593 Bento, 9°12'58.2"S, 54°51'22.8"W, 29 Sep 2019, [st], *R.B. Lopes-Neto et al.* 528 (MG).

594 *Merostachys* sp. is similar to *Merostachys delicatula* R.S. Andrade, Pianiss., Viníc.-Silva
595 & R.P. Oliveira, an Atlantic Forest species only known from type-locality in Serra da
596 Pedra Lascada, Bahia (Northeast Brazil). Along with *Merostachys leptophylla* Send.
597 (registered in Bahia, Espírito Santo and Minas Gerais States), they represent the species
598 with the smallest culm diameter of the genus (between 0.1 and 1.5 cm), sharing also the
599 narrow foliage leaf blade (< 0.8 cm), a character also found in *M. argentea* Send. and *M.*
600 *bifurcata* Send., both Atlantic Forest species (Sendulsky 1997).

601 It resembles *M. delicatula* by the habit initially erect then arching and clambering
602 surrounding the vegetation, culm diameter < 0.5 cm, glabrous to scabrous toward the
603 apex, foliage leaf sheath glabrous, fimbriae yellow-white, straight at the base and sinuous
604 at the apex, blades linear-lanceolate to lanceolate, base rounded and apex attenuate.

605 However, *Merostachys* sp. differs by the absence of an infranodal band of trichomes (Vs.
606 present), branch complement with 20–55 branches (Vs. branch complement with 72–449
607 branches), foliage leaf blades with length:width ratio 12.6–21.6 (Vs. L:W 4–9.5), strongly
608 reflexed (Vs. horizontal blades) and glabrous on both surfaces, sometimes densely pilose
609 at the base of abaxial surface, adaxially with 2–3 prominent and scabrous lateral nerves
610 on one side, when 3, the lateral ones more prominent than the middle one (Vs. glabrous
611 on both surfaces, except the lateral nerves scabrous).

612 *Olyra* L., Syst. Nat. (ed. 10) 2: 1253, 1261, 1379. 1759. Type species: *Olyra latifolia* L.,
613 Syst. Nat. (ed. 10) 2: 1261. 1759.

614 Cespitose plants. Culms homomorphic (dimorphic in *O. ecaudata*), erect or climbing,
615 leaning in the vegetation, up to 3 m tall, infra- and supranodal bands of trichomes absent,
616 unbranched at the lower and median nodes, branched at the upper nodes to produce
617 synflorescences, without thorns. Leaves not differentiated into culm leaves and foliage
618 leaves, sheath not fimbriate, translucent swelling absent, outer ligule absent, blades ovate-
619 lanceolate to lanceolate, midrib not prominent. Synflorescence terminal, typical panicles,
620 composed of 2-8 conjugate branches, the lower branches with male spikelets and with or
621 without terminal female spikelets, the upper branches with male spikelets below and 1-8
622 terminal female spikelets; spikelets with pedicels clavate to subclavate, solitary and
623 unisexual, glumes 2 (female spikelets) or absent (male spikelets). Fruit a basic caryopsis,
624 hilum linear, as long as the caryopsis.

625 *Olyra* is an herbaceous bamboo with erect or climbing culms, up to 3 m tall, with leaves
626 ovate-lanceolate to lanceolate and synflorescence a typical panicles, with 2 – 8 conjugate
627 branches, the lower ones with male spikelets and terminal female spikelet present or
628 absent, the upper ones with male spikelets below and 1 – 8 terminal female spikelets, the
629 female spikelets have clavate to subclavate pedicels and the caryopsis has a linear hilum,
630 as long as the caryopsis (Soderstrom and Zuloaga 1989). The genus has twenty-four
631 species in Central and South America (Kellogg 2015). In Brazil, twenty species occur in
632 Amazon, Caatinga, Cerrado, Mata Atlântica and Pampas (Oliveira *et al.* 2020). In Serra
633 do Cachimbo, it's represented by four species.

634 **Identification key to species of *Olyra* from Serra do Cachimbo, Eastern Amazon,**
635 **Brazil.**

- 636 1. Culms dimorphic, vegetative culms with 5 – 7 leaves clustered in the apex, sheath
 637 sparsely pilose, flowering culms with leaves bladeless, sheath
 638 glabrous.....*Olyra ecaudata*
- 639 1'. Culms homomorphic.....2
- 640 2. Leaf blades ovate to oblong-lanceolate. Female anthercium fusiform, irregularly pitted
 641 with small excavations.....*Olyra taquara*
- 642 2'. Leaf blades ovate-lanceolate. Female anthercium ovoid, smooth.....3
- 643 3. Synflorescence umbelliform, the lower branches spreading and reaching the height of
 644 the upper ones, the male spikelets on short pedicels below and a single terminal female
 645 spikelet on each branch. Female spikelets 23–32 × 4–5 mm, glabrous, the glumes
 646 subequal, apex awned, the awn 13–14 mm long.....*Olyra caudata*
- 647 3'. Synflorescence pyramidal, the lower branches with male spikelets only, the upper
 648 branches with male spikelets below and 1 to many terminal female spikelets. Female
 649 spikelets 10–12 × 1.4–2.2 mm, glabrous to shortly pilose, the glumes unequal, apex
 650 awned, the 3.8–4.8 mm long.....*Olyra latifolia*

651 ***Olyra caudata*** Trin., *Linnaea* 10(3): 292. 1836. Figure 7. a-c.

652 Rhizomes not seen. Culms up to 2m tall, erect, internodes 14–28 cm long, hollow,
 653 smooth, glabrous; nodes dark brown, glabrous. Leaf sheath pubescent, margins short-
 654 ciliate; ligules 4–6 mm, membranous, shortly ciliate at the apex; pseudopetioles 3–4 mm,
 655 flat, brownish, shortly to densely pilose; blades 18–23 × 3.8–5.2 cm, ovate-lanceolate,
 656 short-pilose on both surfaces, asymmetrical, base obtuse, margins scabrous, apex
 657 acuminate. Synflorescence (12-)15–18 × (13-)15–20 cm, umbelliform, the lower

658 branches whorled, the upper branches alternate or verticillate, the male spikelets on short
659 pedicels below, a single terminal female spikelet on each branch, rachis scabrous, the
660 pedicels of male spikelets 1–2 mm, thin, the apex clavate, short-pilose, the pedicels of
661 female spikelets 6.7–7.9 cm, longitudinally ridged, one side flattened, the apex clavate,
662 densely pilose. Male spikelets $2.8\text{--}3.1 \times 0.3$ mm, lanceolate, brownish, hispid, falling
663 entire; lemma 3-nerved, hispid in the apex and margins, apex short-aristate; palea 2-
664 nerved, glabrous to shortly pilose toward the apex, apex short-aristate; stamens 3,
665 included, filaments 0.3–0.5 mm, glabrous, anthers ca. 1.6 mm, black (*in siccus*). Female
666 spikelets $23\text{--}32 \times 4\text{--}5$ mm, ovoid, stramineous (*in siccus*), glabrous, dispersion above the
667 glumes, lately caducous; the glumes subequal, 9-nerved, glabrous, apex awned, the awn
668 13–24 mm long; antherium ca. $6\text{--}8 \times 3\text{--}4$ mm, ovoid, stramineous (*in siccus*), becoming
669 black at maturity, smooth and shiny, deciduous, shortly stipitate at its base, stipe ca. 0.4
670 mm long; lemma with prickly trichomes in the upper margins, apex acute; palea glabrous,
671 apex acute; lodicules not seen; ovary not seen, stigma 2, plumose. Caryopsis not seen.

672 **Distribution and habitat:** Central and South America, in Bolivia, Brazil, Colombia,
673 Costa Rica, Guyana, Panama, Peru, Suriname and Trinidad and Tobago (Soderstrom and
674 Zuloaga 1989). In Brazil, is registered in Amazon Forest, between 150 to 1.100 meters,
675 in the states of Acre, Amazonas, Pará, Rondônia and Mato Grosso (Oliveira *et al.* 2020).
676 In Serra do Cachimbo, was found in Open ombrophilous forest.

677 **Examined specimens. BRAZIL. Pará:** Altamira: Reserva Biológica Nascentes da Serra
678 do Cachimbo, ramal principal da REBIONSC, entrada a 65km de Cachoeira da Serra,
679 $9^{\circ}04'26.7''\text{S}$, $54^{\circ}45'14.6''\text{W}$, 592 m, 25 May 2021, [fl], *R.B. Lopes-Neto* 685 (MG).
680 Itaituba: BR-163, Cuiabá-Santarém Highway, Km 867, Rio Vermelho, 11 Nov 1977, [fl],

681 *A.S.L. Silva 209* (INPA, MG, MO, US); Km 877, Cachoeira da Luz, Rio Curuá, margem
682 esquerda, 02 May 1983, [fl], *I.L. do Amaral et al. 1077* (INPA, MO, NY).

683 *Olyra caudata* and *O. latifolia* share culms up to 2 m tall, ovate-lanceolate leaves,
684 asymmetrical, shortly pilose on both surfaces, female spikelets awned and anthercium
685 ovoid and smooth. However, this species has synflorescence umbelliform, the female
686 spikelets are larger (23–32 × 4–5 mm) and the glumes subequal, with awns 13–14 mm
687 long, while *O. latifolia* has synflorescence pyramidal, the female spikelets smaller (10–
688 12 × 1.4–2.2 mm) and the glumes unequal, awn 3.8–4.8 mm long.

689 *Olyra ecaudata* Döll., Fl. Bras. 2(2): 326. 1877.

690 Rhizomes pachymorph, short necks, ca. 3 mm long. Culms dimorphic, erect; vegetative
691 culms 3–4 m tall, internodes 17–23 cm long, hollow, smooth, glabrous; flowering culms
692 ca. 2 m tall, internodes 45–50 cm long, hollow, smooth, glabrous or short-pubescent;
693 nodes geniculate, thickened, dark brown, glabrous or with retrorse trichomes. Leaves of
694 vegetative culms clustered at the apex, sheath sparsely pilose, short-ciliate brown
695 trichomes in the overlapping margins; ligules ca. 6 mm, membranous, shortly ciliate at
696 the apex; pseudopetioles 3–7 mm, dark brown, shortly pilose on both surfaces, sometimes
697 glabrous in the adaxial surface; blades 17–20 × 3.1–4.5 cm, ovate-lanceolate, geniculate-
698 ascending, 5–7 per complement, glabrous on both surfaces, symmetrical, base slightly
699 cordate, margins short-ciliate at the base and scabrous or glabrous at the apex, apex
700 acuminate; leaves of flowering culms bladeless, sheath glabrous. Synflorescence 9.5–15
701 × 5.6–6.7 cm, obdeltate, the lower branches verticillate, with male spikelets on short
702 branchlets or in pairs, one long- and the other short-pedicellate, the upper branches
703 alternate to opposite, with 2–6 female spikelets, rachis sparsely hirsute, scabrous; the

704 pedicels of the male spikelets 6–8 mm long (long-pedicellate) and 2–3 mm long (short-
 705 pedicellate), the pedicels of the female spikelets 0.9–1.6 cm long, both longitudinally
 706 ridged, clavate at the apex, sparsely hirsute to pilose, scabrous. Male spikelets 6.1–6.8 ×
 707 0.7 mm, lanceolate, yellowish (*in siccus*), scaberulous, apex apiculate, falling entire;
 708 lemma 3-nerved; palea 2-nerved; filaments not seen, anthers ca. 3 mm long, yellow (*in*
 709 *siccus*). Female spikelets 7.3–8.2 × 2–3.3 mm, ovoid, stramineous (*in siccus*), sparsely
 710 pilose toward the nerves and margins, dispersion above the glumes; the glumes subequal,
 711 5-7-nerved, sparsely pilose toward the nerves and margins, apex apiculate; antheridium
 712 4.5–5 × 2.4–2.5 mm, ovoid, stramineous (*in siccus*), with small excavations, deciduous;
 713 lemma 7-8-nerved, scabrous, apex acute; palea 4-nerved, glabrous, apex acute; lodicules
 714 ca. 0.6 mm long; ovary 0.9–1.2 mm long, elliptic, glabrous, style 2.2–3 mm long,
 715 glabrous, stigma 2, plumose. Caryopsis not seen.

716 **Distribution and habitat:** Central and South America, in Bolivia, Brazil, Colombia,
 717 Costa Rica, French Guyana, Suriname and Venezuela, in humid forests below 500 meters
 718 (Soderstrom and Zuloaga 1989). In Brazil, occur in the Amazon (AC, AM, AP, RO, RR
 719 and MT) and Mata Atlântica (BA, PB, ES and SP) (Oliveira *et al.* 2020). In Serra do
 720 Cachimbo, was found near streams in Open ombrophilous forest.

721 **Examined specimens. BRAZIL. Mato Grosso:** Fazenda Cachimbo, sub-base Projeto
 722 RADAM, 20 Nov 1976, [fl], *M.R. Cordeiro 1132* (MG). Ponto 17, 12 Nov 1976, [fl],
 723 *O.C. Nascimento 486* (MG).

724 *Olyra ecaudata* is easily recognized from the other *Olyra* species from Serra do Cachimbo
 725 by the dimorphic culms: vegetative culms 2–4 m tall, with 5–7 clustered leaves at the
 726 apex and sheath pilose, short-ciliate in the margins and flowering culms up to 2 m tall,

727 bladeless, sheath glabrous. It resembles *O. taquara* Swallen with the symmetrical leaves,
728 base cordate and antheridium with small excavations, however, this species differs by the
729 female spikelet and antheridium fusiform (Vs. ovoid) and upper lemma with margins ciliate
730 (Vs. scabrous).

731 ***Olyra latifolia*** L., Syst. Nat. (ed. 10) 2: 1261. 1759. Figure 7. d-f.

732 Rhizomes pachymorph, short necks, ca. 3 mm long. Culms up to 2m tall, erect to
733 decumbent, leaning on the vegetation, internodes 37–43 cm long, hollow, smooth, shortly
734 pilose, adpressed trichomes; nodes compressed, dark, shortly pilose. Leaf sheath shortly
735 pilose, adpressed trichomes, margins ciliate; ligules ca. 0.7 mm long, membranous;
736 pseudopetioles ca. 2.8 mm long, dark brown, shortly pilose; blades 18–22 × 4.6–5.4 cm,
737 ovate-lanceolate, shortly pilose on both surfaces, asymmetrical, base subcordate, margins
738 shortly ciliate to scabrous, apex acuminate. Synflorescence 9–22 × 2–4 cm, pyramidal,
739 the lower branches verticillate, with male spikelets only, the upper branches alternate and
740 with male spikelets below and 1 to many terminal female spikelets, rachis densely pilose,
741 pedicels ca. 0.7 cm long, thickened, glabrous to shortly pilose. Male spikelets 4–4.6 ×
742 0.5–0.7 mm, fusiform, yellowish (*in siccus*), glabrous, falling entire; lemma 3-nerved,
743 apex awned, the awn 3.7–3.8 mm long; palea 2-nerved, apex acute; stamens 3, included,
744 filaments ca. 0.5 mm, glabrous, anthers ca. 2 mm, black (*in siccus*). Female spikelets 10–
745 12 × 1.4–2.2 mm, ovoid, stramineous (*in siccus*), pubescent or short-pilose, dispersion
746 above the glumes; lower glume 7-nerved, margins glabrous or hirsute, apex awned, ca.
747 4.8 mm long; upper glume 5-nerved, margins glabrous, apex awned, ca. 3.8 mm long;
748 antheridium 6.8–7.4 × 1.7–1.9 mm, ovoid, stramineous (*in siccus*), smooth, deciduous;
749 lemma 3-nerved, glabrous to shortly pilose, apex obtuse; palea 2-nerved, shortly pilose at
750 the apex, apex acute; lodicules ca. 0.3 mm; ovary ca. 1. mm long, elliptic, glabrous to

751 shortly pilose, style ca. 3 mm long, glabrous to shortly pilose, stigma 2, plumose.

752 Caryopsis not seen.

753 **Distribution and habitat:** Neotropical (Florida to Argentina) and also naturalized in
 754 Africa (Soderstrom and Zuloaga 1989). In Brazil, it is registered in the Amazon, Caatinga,
 755 Cerrado and Mata Atlântica domains, in all states, except Piauí and Rio Grande do Norte
 756 (Oliveira *et al.* 2020). It occurs in gallery forests, usually below 1.000 meters (Soderstrom
 757 and Zuloaga 1989). In the Serra do Cachimbo, was found in *mata ciliar* in *Campo cerrado*
 758 and Open ombrophilous forest.

759 **Examined specimens. BRAZIL. Pará:** Altamira: Dez 2005, [fl], *M. Sobral 10885*
 760 (HUEFS); Dez 2005 [fl], *M. Sobral 10512* (HUEFS); Reserva Biológica Nascentes da
 761 Serra do Cachimbo, Cachoeira do Curuá, 8°44'05.4"S, 54°57'43"W, 355m, 28 May
 762 2021, [fl], *R.B. Lopes-Neto et al. 755* (MG); Cerca de 16 km a leste da BR 163,
 763 9°04'15.96"S, 54°46'27.32"W, 570m, 28 Sep 2019, [fl], *M. Pastore et al. 1156* (MG);
 764 Ramal principal da REBIONSC, entrada a 65km de Cachoeira da Serra, 25 May 2021,
 765 [fl], *R.B. Lopes-Neto et al. 677* (MG). Novo Progresso: Campo de Provas Brigadeiro
 766 Velloso, Ramal 51, próximo ao estande, no riacho, 9 18 01.7', 54 56 36.1w, 25 Sep 2019,
 767 [fl], *Lopes-Neto et al. 457* (MG).

768 See comments of *O. caudata*.

769 ***Olyra taquara*** Swallen, Phytologia 14(2): 86. 1966. Figure 7. g-l.

770 Short-rhizomatous, thick creeping base. Culms up to 3.5 m tall, erect, internodes 23.6–25
 771 cm long, hollow, smooth, glabrous; nodes not compressed, glabrous to short-pubescent.
 772 Leaf sheath glabrous to pubescent, dark brown trichomes, caducous, margins densely
 773 pubescent, dark brown trichomes, caducous; ligules ca. 1.8 mm, membranous, brownish;

774 pseudopetioles ca. 3 mm long, dark brown, short-pubescent, usually recurved and
775 positioning the blades downward; blades 22–32 × 4.5–6 cm, ovate to oblong-lanceolate,
776 glabrous on both surfaces or sparsely pubescent in the abaxial surface, with caducous
777 trichomes toward the base, symmetrical, base cordate, margins scabrous, apex acuminate.
778 Synflorescence 12–18 × 2.5–15 cm, paniculiform, the lower branches whorled, the upper
779 ones alternate, each branch with male spikelets in pairs, one short- and the other long-
780 pedicellate and 2–4 terminal female spikelets, rachis strongly angled and sparingly pilose,
781 pedicels ca. 1 mm, filiform, scabrous. Male spikelets 13 × 0.9–2 mm, lanceolate,
782 yellowish (*in siccus*), glabrous, falling entire; lemma 3-nerved, apex awned, ca. 2 mm
783 long; palea 2-nerved, apex apiculate; stamens 3, included, filaments ca. 0.2 mm, glabrous,
784 anthers ca. 3 mm, black (*in siccus*). Female spikelets 10–20 × 3–4 mm, fusiform, pale
785 green to stramineous *in siccus*, mottled with purple spots, shortly pilose, dispersion above
786 the glumes; the glumes subequal, 5-nerved, apex aristate; antherium 8–9 × 2–3 mm,
787 fusiform, stramineous (*in siccus*), indurate, irregular pitted with small excavations;
788 lemma 5-nerved, glabrous, margins ciliate, apex acute; palea 2-nerved, glabrous;
789 lodicules ca 2 mm long; ovary ca. 2 mm long, fusiform, glabrous, style 3.5 mm long,
790 glabrous, stigma 2, plumose. Caryopsis not seen.

791 **Distribution and habitat:** Central Brazil (DF, GO, MG, MT, MS and PA), in shade of
792 gallery forests between 300 to 1.000 meters (Soderstrom and Zuloaga 1989). In the Serra
793 do Cachimbo, it was found in Open ombrophilous forest.

794 **Examined specimens. BRAZIL. Pará:** 14 Dez 1956, [fl], *J.M. Pires & G.A. Black 6261*
795 (IAN). Altamira: Reserva Biológica Nascentes da Serra do Cachimbo, Br-163, Ramal de
796 Fazenda a 9.9 km ao sul da Cachoeira do Curuá, 8°49'10.1"S, 54°57'34.4"W, 456 m, 23
797 May 2021, [fl], *R.B. Lopes-Neto et al. 638* (MG); Ramal principal da REBIONSC, entrada

798 a 65km ao sul de Cachoeira da Serra, 9°04'27"S, 54°45'17.1"W, 591m, 25 May 2021,
799 [fl], *R.B. Lopes Neto et al. 681* (MG). Novo Progresso: Campo de Provas Brigadeiro
800 Velloso, Acesso pela Br-163, a 64km ao sul de Cachoeira da Serra, 9°11'05.8"S,
801 54°54'19"W, 559m, 24 May 2021, [fl], *R.B. Lopes-Neto et al. 669* (MG).

802 *Olyra taquara* is distinguished from its co-generics from Serra do Cachimbo by the ovate
803 to oblong-lanceolate leaves, pseudopetioles usually recurved and positioning the blades
804 downward and the female spikelets and anthercium fusiform, the anthercium with small
805 excavations. See comments of *O. ecaudata* to differentiate these two species.

806 ***Pariana*** Aubl., Hist. Pl. Guiane 2: 876, pl. 337; 1775. Type species: *Pariana campestris*
807 Aubl., Hist. Pl. Guiane 2: 876, t. 337. 1775.

808 Cespitose plants. Culms homomorphic or dimorphic, the flowering culm bladeless to
809 leafy and similar to vegetative culms, erect, decumbent or prostrate, 0.3 to 1 m tall, infra-
810 and supranodal bands of trichomes absent, unbranched, without thorns. Leaves not
811 differentiated into culm leaves and foliage leaves. Leaves with sheath fimbriate,
812 translucent swelling present near in the top, outer ligule absent, blades ovate, elliptic or
813 lanceolate, midrib not prominent. Synflorescence terminal, spiciform, constituted by a
814 series of whorls, connected by the rachis nodes, each whorl is formed by one female
815 spikelet surrounded by five male spikelets; spikelets sessile (female spikelets) or with
816 fused flat and indurate pedicels (male spikelets), unisexual, glumes 2-numerous. Fruit a
817 basic caryopsis.

818 *Pariana* is an herbaceous bamboo genus with erect, decumbent or prostrate culms,
819 sometimes dimorphic with flowering culm bladeless or similar to vegetative culms, leaves
820 blades are ovate, elliptic or lanceolate, fimbriae and translucent swelling are present near

821 in the apex of sheaths and synflorescence are terminal and spiciform, constituted by a
 822 series of whorls, each whorl is formed by one female spikelet surrounded by five male
 823 spikelets, these with flat, indurate and fused pedicels. It's a neotropical genus with
 824 twenty-eight described species (Ferreira *et al.* 2019; Dias *et al.* 2021). In the Serra do
 825 Cachimbo, it's represented by two species.

826 **Identification key to species of *Pariana* from the Serra do Cachimbo, Eastern**
 827 **Amazon, Brazil.**

828 1. Leaf sheath with auricles inconspicuous, fimbriae abundant, 10–18 per leaves, blades
 829 7.8–9 × 2.3–4.1 cm, elliptic to ovate-lanceolate, abaxially shortly pilose, adaxially
 830 glabrous, apex acute. Male spikelets with glumes 2-3-
 831 nerved.....*Pariana radciflora*

832 1'. Leaf sheath with auricles distinctly developed, few fimbriate, 6–7 per leaves, blades
 833 7.6-7.9 x 1.9-2.7 cm, oblong-lanceolate, glabrous on both surfaces, apex acuminate. Male
 834 spikelets with glumes 2-nerved, but only one evident.....*Pariana zingiberina*

835 ***Pariana radciflora*** Sagote x Döll, Fl. Bras. 2(2): 336. 1877.

836 Short-rhizomatous. Culms dimorphic; vegetative culms 46–49 cm tall, erect, internodes
 837 ca. 5 cm long, solid, smooth, shortly pilose to glabrescent; flowering culms 17.5–24.2
 838 cm, erect, internodes 5–6 cm long, solid, smooth, glabrous; nodes dark brown, glabrous.
 839 Leaves distributed along the culm, the lower ones bladeless, sheath shortly pilose,
 840 margins glabrous; ligules ca. 1mm long, membranous, short-ciliate at the apex; auricles
 841 inconspicuous, fimbriae present, abundant, 10–18 per leaves, ca. 5 mm long;
 842 pseudopetioles ca. 2 mm long, dark green, shortly pilose; blades 7.8–9 × 2.3–4.1 cm,
 843 elliptic or ovate-lanceolate, abaxially shortly pilose, adaxially glabrous, midnerve densely

844 pubescent, asymmetrical, base rounded, margins scabridulous, apex acute; flowering
845 culm leaves bladeless, sheath shortly pilose, margins glabrous. Synflorescence 5–7 cm
846 long, rachis shortly pilose to glabrescent. Male spikelets ca. 5×3 mm, ellipsoid, dorsally
847 compressed; pedicels ca. 2.6 mm long, shortly pubescent, densely pubescent at the base,
848 spikelets not covering the pedicels; glumes subequal, ca. 4×3 mm, ovate-lanceolate, 2–
849 3-nerved, stramineous (*in siccus*), shortly pilose, margins scabridulous, apex acute;
850 lemma ca. 5×3 mm, elliptic, 3-nerved, stramineous (*in siccus*), shortly pilose, margins
851 glabrous, apex acute; palea ca. 4×2 mm, elliptic, 3-nerved, stramineous (*in siccus*),
852 glabrous, margins glabrous, apex acute; stamens 8, not fused, exserted, filaments ca. 2
853 mm long, glabrous, anthers ca. 3 mm long, yellowish (*in siccus*). Female spikelets $5\text{--}6 \times$
854 $3\text{--}3.2$ mm, ovate-triangular, laterally compressed; glumes 2, subequal, elliptic or ovate,
855 1-nerved, stramineous (*in siccus*), shortly-pilose, margins scabridulous, apex acute;
856 antheridium ca. 6×3.2 mm, elliptic or ovate, stramineous (*in siccus*), scabridulous toward
857 the apex, margins glabrous, apex acute; lemma 3-nerved; palea 2-nerved; staminodes
858 absent; ovary ca. 3 mm long, elliptic, glabrous; style ca. 3 mm long, glabrous. Caryopsis
859 not seen. Terminal spikelet ca. 7×3 mm, sterile, elliptic, glumes 3-nerved, stramineous
860 (*in siccus*), shortly pilose, margins scabridulous, apex acute; glume I ca. 7×3 mm; glume
861 II ca. 5×3 mm; glume III $4\text{--}5 \times 2.5$ mm; antheridium ca. 5×2 mm, elliptic, stramineous
862 (*in siccus*), scabridulous toward the apex, margins glabrous, apex acute; lemma 3-nerved;
863 palea 3-nerved.

864 **Distribution and habitat:** Bolivia, Brazil, Colombia, Ecuador, French Guyana, Panama,
865 Peru, Suriname and Venezuela (Judziewicz *et al.* 2000). In Brazil, it is registered in the
866 states of Amazonas and Pará (Flora do Brasil 2020) and this is the first record for the
867 Mato Grosso State. In the Serra do Cachimbo, it was found in Open ombrophilous forest.

868 **Examined specimens. BRAZIL. Mato Grosso:** Novo Mundo: Parque Estadual
 869 Cristalino, Mata alta próxima a base da serra em terreno plano. Subosque aberto,
 870 9°40'12"S, 55°26'17.9"W, 398m, 02 Feb 2008, [fl], *Sasaki et al.* 2148 (HERBAM); Mata
 871 alta de encosta, 09°28'0.001"S, 55°49'41.002"W, 302m, 03 Jun 2007, [fl], *Sasaki et al.*
 872 1745 (HERBAM). **Pará:** 16 Dec 1956, [fl], *J.M. Pires & G.A. Black* 6369 (IAN).

873 **Additional specimens examined. BRAZIL. Pará:** Belém: IPEAN, Reserva Aurá, 02
 874 Apr 1968, [fl], *J.M. Pires & N.T. Silva* 11530 (IAN).

875 *Pariana radciflora* and *P. zingiberina* are very similar species, sharing the dimorphic
 876 culms (the flowering culm bladeless) and synflorescence 5–7.5 cm long, stout, the
 877 pedicels of the male spikelets densely pubescent at the base, the female spikelet with
 878 glumes subequal, elliptic, 1-nerved and terminal spikelet ca. 7 x 3 mm, sterile and elliptic.
 879 However, can be distinguished by the sheath auricles inconspicuous, fimbriae abundant,
 880 10–18 per leaves, blades 7.8–9 × 2.3–4.1 cm, elliptic to ovate-lanceolate, abaxially shortly
 881 pilose, adaxially glabrous, apex acute and male spikelets with glumes 2-3-nerved.

882 *Pariana zingiberina* Rich. Ex Döll, Fl. Bras. 2(2): 337. 1877.

883 Short-rhizomatous. Culms dimorphic; vegetative culms 42–46 cm tall, erect, internodes
 884 ca. 4 cm long, pithy in center, smooth, shortly-pubescent, with retrorse trichomes;
 885 flowering culms ca. 18 cm tall, erect, internodes ca. 4 cm long, pithy in center, smooth,
 886 shortly-pubescent; nodes brownish (*in siccus*), glabrous. Leaves distributed along the
 887 culm, the lower ones bladeless, sheath shortly-pubescent, margins glabrous; ligules ca. 1
 888 mm long, membranous; auricles distinctly developed, fimbriae present, few, 6–7 per
 889 leaves, erect, 5–6 mm long; pseudopetioles ca. 3 mm long, dark brown, puberulent; blades
 890 7.6–7.9 × 1.9–2.7 cm, oblong-lanceolate, glabrous on both surfaces, midnerve densely

891 pubescent, slightly asymmetrical, base attenuate, margins scabridulous, apex acuminate;
892 flowering culm bladeless, sheath shortly pilose, margins scabridulous. Synflorescence
893 5.6–7.5 cm long, rachis puberulent. Male spikelets ca. 6×3 mm, ellipsoid, dorsally
894 compressed; pedicels ca. 3 mm long, glabrous to glabrescent, densely pubescent at the
895 base, spikelets not covering the pedicels; glumes subequal, $4\text{--}5 \times 1$ mm, ovate-lanceolate,
896 2-nerved, but only one evident, stramineous (*in siccus*), shortly pilose, margins
897 scabridulous, apex acute to acuminate; lemma ca. 6×3 mm, elliptic, 3-nerved,
898 stramineous (*in siccus*), shortly pilose, margins glabrous, apex acute; palea ca. 5×2 mm,
899 elliptic, 2-nerved, stramineous (*in siccus*), shortly pilose to glabrescent, margins glabrous,
900 apex acute; stamens 8–10, not fused, exerted, filaments 3–4 mm long, glabrous, anthers
901 ca. 2 mm long, brownish (*in siccus*). Female spikelets ca. 6×3 mm, ovoid, dorsally
902 compressed; glumes 2, subequal, elliptic, 1-nerved, hyaline (*in siccus*), glabrous, margins
903 scabridulous, apex acute; antheridium ca. 6×3 mm, ovoid, stramineous (*in siccus*),
904 scabridulous toward the apex, margins glabrous, apex acute; lemma 3-nerved; palea 2-
905 nerved; staminodes absent; ovary ca. 1 mm long, elliptic, glabrous; style not seen.
906 Caryopsis not seen. Terminal spikelet ca. 7×3 mm, sterile, ellipsoid; glumes 3-nerved,
907 stramineous (*in siccus*), shortly pilose, margins scabridulous, apex acuminate; glume I ca.
908 7×3 mm; glume II ca. 6×3 mm; glume III ca. 5×3 mm; antheridium ca. 5×2 mm,
909 elliptic, stramineous (*in siccus*), scabridulous toward the apex, margins glabrous, apex
910 acute; lemma 3-nerved; palea 2-nerved.

911 **Distribution and habitat:** Bolivia, Brazil, French Guyana, Peru and Venezuela
912 (Judziewicz *et al.* 2000). In Brazil, it is registered in the states of Acre, Amapá and Pará
913 (Flora do Brasil 2020) and this is the first record for the Mato Grosso State. In the Serra
914 do Cachimbo, it was found in Open ombrophilous forest.

915 **Examined specimens. BRAZIL. Mato Grosso:** Novo Mundo: Parque Estadual do
 916 Cristalino, Cruz da malta piloto, trilha de acesso, 9°29'43.72"S, 55°09'57.07"W, 347m,
 917 [fl], *D.R. Diacoppini & M.O. Córdova 527* (CNMT). **Pará:** Altamira: Dec 2005, [fl], *M.*
 918 *Sobral 10476* (HUEFS).

919 **Additional specimens examined. BRAZIL. Pará:** Boca do Rio Juruena, fronteira
 920 Amazonas-Pará-Mato Grosso, 31-XII-1951, [fl], *J.M. Pires 3701* (IAN); Foz do Rio
 921 Juruena, margem direita, 1-I-1952, [fl], *J.M. Pires 3720* (IAN). Missão Cururu, cerrado
 922 on hillside of white sand and dense forest at base of hill, °35'S, 57°31'W, 140m, 08 feb
 923 1974, [fl], *W.R. Anderson 10645* (IAN).

924 *Pariana zingiberina* differs from *P. radiceflora* by the sheath auricles distinctly
 925 developed, leaves few fimbriate, 6-7 per leaves, blades 7.6–7.9 × 1.9–2.7 cm, oblong-
 926 lanceolate, glabrous on both surfaces, apex acuminate and male spikelets with glumes 2-
 927 nerved, but only one evident. Many morphological characters of these two species are
 928 variable and overlapping (see *P. radiceflora* comments). Further study is needed to
 929 unravel the delimitation at a specific level.

930 ***Parodiolyra*** Soderstr. & Zuloaga, *Smithsonian Contr. Bot.* 69: 64. 1989. Type species:
 931 *Parodiolyra ramosissima* (Trin.) Soderstr. & Zuloaga *Smithsonian Contr. Bot.* 69: 743.
 932 1989.

933 Cespitose plants. Culms homomorphic, arching and clambering, up to 3 m tall, infra- and
 934 supranodal bands of trichomes absent. Profusely branched from the median and upper
 935 nodes, without thorns. Leaves not differentiated into culm leaves and foliage leaves.
 936 Leaves with sheath not fimbriate, translucent swelling absent, outer ligule absent, blades
 937 large, ovate-lanceolate to lanceolate, midrib not prominent. Synflorescence terminal,

938 typical panicles, the lower branches with male spikelets only, the upper branches with
939 male spikelets below and terminal female spikelets above or female spikelet only;
940 spikelets with filiform pedicels, solitary and unisexual, glumes 2 (female spikelets) or
941 absent (male spikelets). Fruit a basic caryopsis, hilum linear, $\frac{1}{2}$ - $\frac{3}{4}$ the length of
942 caryopsis.

943 *Parodiolyra* is an herbaceous bamboo mainly characterized by the erect to scandent
944 culms, up to 3m tall, large leaves, ovate-lanceolate to lanceolate and synflorescence
945 terminal, compound by typical panicles, the lower branches with male spikelets, the upper
946 ones with male spikelets below and terminal female spikelets or only bearing female
947 spikelets, these with filiform pedicels, the fruit is a basic caryopsis with hilum linear, $\frac{1}{2}$ -
948 $\frac{3}{4}$ the length of the caryopsis (Soderstrom and Zuloaga 1981). The genus has four species
949 in Costa Rica to South America (Kellogg 2015; Oliveira et al. 2019). In Brazil, three
950 species occur in Amazon and Mata Atlântica (Oliveira *et al.* 2020). In the Serra do
951 Cachimbo, it's represented by one species.

952 *Parodiolyra luetzelburgii* (Pillg.) Soderstr & Zuloaga, Smithsonian Contr. Bot. 69: 70.
953 1989. Figure 7. m-n.

954 Short-rhizomatous. Culms 100–123 cm tall, erect to geniculate, internodes 19–26 cm,
955 hollow, smooth, glabrescent, with white trichomes; nodes dark brown, thickened, with
956 white trichomes. Leaf sheath glabrous, margins densely ciliate; ligules ca. 1.2 mm,
957 membranous, shortly ciliate at the apex; pseudopetioles 3–6 mm, flat, glabrescent, with
958 yellow trichomes (*in siccus*); blades 25–29 × 5.5–7 cm, ovate-lanceolate, glabrous on
959 both surfaces, slightly asymmetrical, base truncate, margins long-ciliate, apex acuminate.
960 Synflorescence ca. 7–16 × 5–6 cm, pyramidal, rachis shortly pilose, trichomes ca. 0.3

961 mm, pedicels 0.1–0.8 cm, filiform, hispid. Male spikelets 5–6 × 0.3–0.4 mm, lanceolate,
962 stramineous (*in siccus*), hispid, falling entire; lemma 3–4-nerved, hispid, apex acuminate,
963 1–2 mm long; palea 2-nerved, sparsely hispid in the middle portion, apex acute; stamens
964 2, included, filaments ca. 0.4 mm long, glabrous, anthers ca. 1.4–1.9 mm, yellowish (*in*
965 *siccus*). Female spikelets 3–4 × 1.7–2 mm, ellipsoid, inflated, purplish (*in siccus*), covered
966 by long and retrorse trichomes, thickened and elongated in the nerves; lower glume 5-7-
967 nerved, apex acuminate, 2–4 mm; upper glume 5-7-nerved, apex acuminate, 2–4 mm;
968 antheridium 1.9–2.2 × 1.3–1.6 mm, lanceolate, shorter than the glumes, stramineous (*in*
969 *siccus*), smooth and shiny, caducous; lemma 5-nerved, pilose, apex rounded; palea 2-
970 nerved, glabrous, apex rounded; lodicules not seen; ovary 0.5–1.1 mm, elliptic, glabrous,
971 style 1, ca. 0.3 mm long, glabrous, stigma 2, plumose. Caryopsis not seen.

972 **Distribution and habitat:** Northern South America, in Brazil, Colombia, Guyana,
973 French Guyana, Suriname and Venezuela (Soderstrom and Zuloaga 1989). In Brazil, is
974 registered in North (AC, AM, AP, PA and RR), Central-West (MT) and Northeast (MA)
975 regions (Oliveira *et al.* 2020). It grows in open areas, sandy slopes and mountain ranges
976 from 100 to 600m (Soderstrom and Zuloaga 1989). In Serra do Cachimbo was found in
977 Open ombrophilous forest.

978 **Examined specimens. BRAZIL. Mato Grosso:** Colider: Estrada Santarém-Cuiabá, BR-
979 163, Km 762, a 30 Km de Guarantã, 19 Apr 1983, [fl], *I.L. do Amaral et al. 815* (INPA,
980 MO, NY, RB).

981 *Parodiolyra luetzelburgii* resembles the *Olyra* species from Serra do Cachimbo by its
982 paniculate synflorescence and size of culm and leaf blades, however it differs by the
983 smaller female spikelets, ca. 3–4 mm long (Vs. 7.3–32 mm long) with filiform pedicels

984 (Vs. clavate to subclavate pedicels in *Olyra*). It can also be recognized by the blade
985 margins long-ciliate, synflorescence with lower branches whorled, bearing only male
986 spikelets, these lanceolate and hirsute.

987 ***Raddiella*** Swallen, Bull. Torrey Bot. Club 75(1): 89. 1948. Type species: *Raddiella*
988 *esenbeckii* (Steud.) C.E. Calderón & Soderstr., Smithsonian Contr. Bot. 44: 21. 1980.

989 Tufted or delicate plants, forming low mats. Culms homomorphic, commonly decumbent,
990 to 0.4 m tall, infra- and supranodal bands of trichomes absent, unbranched or branched,
991 without thorns. Leaves not differentiated into culm leaves and foliage leaves. Leaves with
992 sheath not fimbriate, translucent swelling absent, outer ligule absent, blades ovate-
993 triangular to elliptical, midrib not prominent. Synflorescence terminal and axillary,
994 racemose, terminal synflorescence with male and female spikelets or more commonly
995 strictly male, rarely female, axillary synflorescence barely exerted from the leaf sheaths;
996 spikelets with filiform pedicels, solitary and unisexual, glumes 2 (female spikelets) or
997 absent (male spikelets). Fruit a basic caryopsis, hilum punctiform or short-linear, ca. ½
998 the length of caryopsis.

999 *Raddiella* is an herbaceous bamboo with eight species in Central and South America
1000 (Kellogg 2015). It's mainly characterized by the decumbent culms, up to 30 cm tall, small
1001 leaves, ovate-triangular or elliptic, sheath not fimbriate and racemose synflorescence
1002 terminal and axillary, the terminal ones with male and female spikelets or more
1003 commonly only bearing male spikelets, axillary synflorescences barely exerted from the
1004 leaf sheath, the spikelets in filiform pedicels and fruit a basic caryopsis, hilum punctiform
1005 or short-linear (Judziewicz and Zuloaga 1991). In Brazil, five species occur in Amazon,

1006 Caatinga, Cerrado and Mata Atlântica (Oliveira and Oliveira 2020). In the Serra do
1007 Cachimbo, it's represented by three species.

1008 **Identification key to species of *Raddiella* from the Serra do Cachimbo, Eastern**
1009 **Amazon, Brazil.**

1010 1. Leaf blades elliptical, symmetrical, base and apex acute, short-pilose on both surfaces
1011 or with scabrid trichomes only on the lower surface. Female spikelets falling
1012 entire.....*R. malmeana*

1013 1'. Leaf blades ovate-triangular, asymmetrical, base truncate, apex acute, apiculate or
1014 short-apiculate, glabrous or short-pilose near the base on the upper surface, to densely
1015 puberulent on both surfaces. Female spikelets with persistent glumes and caducous
1016 floret.....2

1017 2. Densely tufted perennials, culms 9–40 cm tall. Terminal synflorescences with (1)2-4
1018 male spikelets, ca. 3 mm long, lanceolate. Axillary inflorescences with both male and
1019 female spikelets, the female spikelets ca. 2.1 × 1 mm long,
1020 ovoid.....*R. esenbeckii*

1021 2'. Tiny, straggling herbs of indefinite duration, up to 6 cm long. Terminal inflorescences
1022 with 1 terminal male spikelet, ca. 1.3 mm long, elliptical. Axillary inflorescences with 2(-
1023 3) female spikelets, 1–1.3 mm long, lanceolate-
1024 ovate.....*R. minima*

1025 ***Raddiella esenbeckii* (Steud.) C.E. Calderón & Soderstr., Smithsonian Contr. Bot. 44:**
1026 **21. 1980. Figure 8. a-c.**

1027 Rhizomes absent. Culms 9–40 cm tall, sprawling, decumbent to geniculate, the erect
1028 portions wiry, internodes 2.5–3.2 cm, pithy in center, smooth, glabrous to sparsely pilose
1029 with short, retrorse trichomes; nodes thickened, densely pilose with whitish retrorse
1030 trichomes. Leaf sheath glabrous to short-pilose, densely toward the summit; ligules ca.
1031 0.3 mm, membranous, short-ciliate in the apex; pseudopetioles 0.5–0.8 mm, stramineous
1032 (*in siccus*), densely pilose; blades 1.5–1.8 × 0.5–0.6 cm, ovate-triangular, firmly
1033 membranous, densely puberulent on both surfaces or glabrous in the abaxial surface and
1034 short-pilose near the base of the adaxial surface, asymmetrical, base truncate, ciliate in
1035 the lower margins, apex acute or short-apiculate. Terminal synflorescences 4–5 mm long,
1036 with male spikelets only, rachis short-pilose, pedicels ca. 2.5 – 5 mm long, filiform,
1037 minutely cupuliform at the apex, short-pilose. Axillary synflorescences ca. 1.3 cm long,
1038 with both male and female spikelets, male spikelets (1)2-4, female spikelets 2, partially
1039 included in the leaf sheath, rachis short-pilose, pedicels 1–2 mm long, filiform, short-
1040 pilose. Male spikelets ca. 3 mm long, lanceolate, hyaline (*in siccus*), glabrous to sparsely
1041 hispid with short trichomes, falling entire; glume occasionally present, ca. 2 mm long,
1042 linear-lanceolate, 1-nerved, membranous, shortly hispid, apex acuminate; lemma 3-
1043 nerved, glabrous to sparsely hispid with short trichomes, apex acuminate; palea 2-nerved,
1044 glabrous to sparsely hispid with short trichomes, apex acuminate; stamens 2, included,
1045 filaments 0.05 mm long, glabrous, anthers ca. 1.3 mm long, black (*in siccus*). Female
1046 spikelets ca. 2.1 × 1 mm, ovoid, greenish (*in siccus*), sparsely to densely short-pilose,
1047 membranous, the internodes between the glumes thickened, glumes deciduous; lower
1048 glume ca. 2.1 × 1 mm, 3-nerved, apex acuminate; upper glume ca. 2 × 1 mm, 3-nerved,
1049 apex acute; antheridium ca. 1.3 × 1 mm, ellipsoid, whitish (*in siccus*), compressed,
1050 coriaceous, deciduous; lemma 3-nerved, glabrous, apex acute; palea 2-nerved, glabrous,

1051 apex acute; ovary ca. 0.2 mm, ellipsoid, glabrous, style ca. 1 mm, glabrous to sparsely
 1052 short-pilose, stigma 2, plumose. Caryopsis not seen.

1053 **Distribution and habitat:** Central and South America, in Panama to Bolivia and Central
 1054 Brazil (Zuloaga and Judziewicz 1991). In Brazil, is registered in the North (AM, AP, PA,
 1055 RO, RR and TO), Northeast (BA, MA and PI), Central-West (DF, GO, MT and MS),
 1056 Southeast (MG and SP) and South (PR) regions (Oliveira and Oliveira 2020). It can be
 1057 found in gallery forests, Savannas and Cerrados, in semi-shaded or dryish open areas, up
 1058 to 1.500 meters (Zuloaga and Judziewicz 1991). In the Serra do Cachimbo, was found in
 1059 *Campo cerrado*, *Campo rupestre* and Open ombrophilous forest.

1060 **Examined specimens. BRAZIL. Mato Grosso:** Colider: Estrada Santarém-Cuiabá, BR
 1061 163 km 762, a 30 km de Guarantã, 19 Apr 1983, [fl], *I.L. do Amaral 806* (MG, INPA,
 1062 MO, RB, US). Guarantã do Norte: Estrada Guarantã do Norte - Cachimbo, ca. 8 Km antes
 1063 da divisa com o Estado do Pará, 26 Apr 1997, [fl], *V.C. Souza et al. 15861* (ESA); ca. 13
 1064 Km antes da divisa com o Estado do Pará, 26 Apr 1997, [fl], *V.C. Souza et al. 15805*
 1065 (ESA); ca. 18 Km antes da divisa com o Estado do Pará, 26 Apr 1997, [fl], *V.C. Souza et*
 1066 *al. 15767* (ESA, UFMT). **Pará:** Altamira: Cachoeira do Rio Curuá, BR-163 a 600 km de
 1067 Itaituba-PA, 24 May 2005, [fl], *J.B. Silva 1441* (HUEFS); *ibid.*, 8°44'01.2"S,
 1068 54°57'45.5"W, 28 May 2021, [fl], *R.B. Lopes-Neto 767* (MG).

1069 *Raddiella esenbeckii* and *R. minima* share the ovate-triangular leaves, asymmetrical,
 1070 truncate at the base and female spikelets with persistent glumes. However, *R. esenbeckii*
 1071 is easily recognized by the decumbent to geniculate culms, 9-40 cm tall. The terminal
 1072 synflorescence has (1)2–4 lanceolate male spikelets and axillary synflorescences have

1073 male and female spikelets, these ovoids. It also can be distinguished by the caryopsis
1074 long-ellipsoid, hilum short-linear, ca. 1/3 the length the caryopsis.

1075 *Raddiella malmeana* (Ekman) Swallen, Bull Torrey Bot. Club 75(1): 89. 1948. Figure 8.
1076 e-j.

1077 Rhizomes absent. Culms 11–28 cm tall, decumbent and rooting at the lower nodes,
1078 forming low mats, internodes 1.2–1.4 cm, pithy in center, smooth, glabrous; nodes
1079 glabrous. Leaf sheath glabrous, margins membranous, with short trichomes in the apex,
1080 ca. 0.3 mm long, fimbriae absent; ligules ca. 0.3 mm, membranous; pseudopetioles ca.
1081 0.3 mm, brownish, glabrous; blades 1.1–1.2 × 0.3–0.4 cm, elliptical, delicately
1082 membranous, short-pilose on both surfaces, symmetrical, base acute, margins
1083 scaberulous, apex acute. Terminal synflorescences ca. 5 mm long, with a single male
1084 spikelet, rachis glabrous, pedicels ca. 2 mm long, filiform, glabrous. Axillary
1085 synflorescences 0.9–1 × 0.2 cm, female spikelets 2–4, rachis glabrous, pedicels 0.2–0.4
1086 mm, filiform, glabrous. Male spikelets ca. 3 × 0.8 mm, lanceolate, hyaline, short-pilose
1087 toward the apex, falling entire; lemma 3-nerved; palea 2-nerved; stamens 2, exerted,
1088 filaments ca. 1–2 mm long, glabrous, anthers ca. 2 mm long, yellowish. Female spikelets
1089 ca. 2 × 0.7 mm, narrowly ovoid, white, short-hispid, delicately membranous, falling
1090 entire; lower glume ca. 2 × 0.6 mm, 5-nerved, delicately membranous, short-hispid, with
1091 long trichomes mainly in the nerves, apex acuminate; upper glume ca. 2 × 0.6 mm, 5-
1092 nerved, delicately membranous, short-hispid, with long trichomes mainly in the nerves,
1093 apex acuminate; antheridium ca. 1.3 × 0.6 mm, narrowly ovoid, white, compressed,
1094 delicately membranous, deciduous; lemma 2-nerved, glabrous, apex acute; palea 2-
1095 nerved, glabrous, apex acute; ovary 0.3–0.6 mm tall, elliptic, glabrous, style ca. 0.6 mm,
1096 glabrous, membranous in the base, stigma 2, plumose. Caryopsis not seen.

1097 **Distribution and habitat:** Endemic to Brazil, in wet rocks near streams, usually
1098 associated with waterfalls, in the states of Mato Grosso and Pará (Zuloaga and
1099 Judziewicz, 1991; Oliveira and Oliveira 2020). In the Serra do Cachimbo, it was found
1100 in Open ombrophilous forest, in Curuá (REBIONSC), Harpia and Toca das Ariranhas
1101 (CPBV) waterfalls.

1102 **Examined specimens. BRAZIL. Pará:** Altamira, Reserva Biológica Nascentes da Serra
1103 do Cachimbo, Cachoeira do Rio Curuá, 8°44'05.7"S, 54°57'42.5"W, 30 Sep 2019, [st],
1104 *R.B. Lopes-Neto et al. 558* (MG). Itaituba: Estrada Santarém-Cuiabá, BR-163, km 877,
1105 Cachoeira da Luz, rio Curuá, margem esquerda, 02 May 1983, [fl] *I.L. do Amaral 1072*
1106 (INPA); Vale de solo pedregoso, embaixo da Cachoeira da Luz do Rio Curuá, 02 May
1107 1983, [fl], *M.N. da Silva 196* (INPA). Novo Progresso: Campo de Provas Brigadeiro
1108 Velloso, Cachoeira da Harpia, 01 Oct 2019, [fl], *R.B. Lopes-Neto et al. 569* (MG); Toca
1109 das Ariranhas, 9°21'45.4"S, 54°54'09.2"W, 451m, 27 May 2021, [fl], *R.B. Lopes-Neto*
1110 *et al. 751* (MG).

1111 *Raddiella malmeana* is mainly characterized by the decumbent culm, rooting in the lower
1112 nodes, forming low mats, leaves elliptic, symmetrical, with base and apex acute, short-
1113 pilose on both surfaces or scabrous in the abaxial surface, terminal synflorescence with a
1114 solitary male spikelet and axillary synflorescences with 2–4 female spikelets, narrowly
1115 ovoid, short-hispid, falling entire.

1116 *Raddiella minima* Judz. & Zuloaga, Ann. Missouri Bot. Gard. 78(4): 939. 1991. Figure
1117 8. k-m.

1118 Rhizomes absent. Culms to 6 cm long, filiform, geniculate, multi-branches, internodes
1119 ca. 5 mm, smooth, glabrous; nodes dark brown, with a few very short retrorse trichomes.

1120 Leaf sheath ca. 2 mm, glabrous to short-pilose, the upper margins ciliate, fimbriae absent;
1121 ligules ca. 0.2 mm, membranous; pseudopetioles 0.1–0.2 mm long, dark green, glabrous
1122 to short-pilose; blades 4–6 × 2.7–3.3 mm, ovate-triangular, delicately membranous,
1123 glabrous, asymmetrical, base truncate, margins scaberulous, apex acute or apiculate.
1124 Terminal synflorescences ca. 10 mm long, with a single male spikelet. Axillary
1125 synflorescences ca. 3 mm long, female spikelets 2(-3). Male spikelets ca. 1.3 mm long,
1126 elliptical, hyaline, glabrous, the lemma soon caducous. Female spikelets 1–1.4 mm long,
1127 lanceolate-ovoid, glabrous to short-hispid, delicately membranous; lower glume 3-
1128 nerved, apex acuminate; upper glume 3-nerved, apex acuminate; antherium 0.9–1.2 mm
1129 long, ovoid, white becoming dark, dorsally compressed, smooth and shiny, caducous.
1130 Caryopsis not seen.

1131 **Distribution and habitat:** Endemic to Brazil, in the states of Amazonas, Mato Grosso
1132 and Pará (Zuloaga and Judziewicz 1991; Oliveira and Oliveira 2020). In Serra do
1133 Cachimbo, was found in *campo rupestre* near the borders of Mato Grosso and Pará States
1134 (Zuloaga and Judziewicz 1991).

1135 **Examined specimens. BRAZIL. Pará:** Itaituba: Estrada Santarém-Cuiabá, BR 163, Km
1136 771, próximo a divisão Pará-MT, 22 Apr 1983, [fl], *I.L. do Amaral 883* (INPA, MO).

1137 **Additional specimens examined. BRAZIL. Amazonas:** Canutama, Joana D'Arc,
1138 8°39'27"S, 64°21'39"W, 95m, 23 Apr 2007, [fl], *P.L. Viana et al. 2634* (INPA).

1139 *Raddiella minima* is one of the smallest bamboos of the world, with filiform culms up to
1140 6 cm tall, ovate-triangular leaves, asymmetrical, glabrous, base truncate and apex acute
1141 to apiculate. The terminal synflorescence has a single elliptic male spikelet and the

1142 axillary synflorescences has 2(-3) ovate-lanceolate female spikelets. The caryopsis is
1143 ovoid-globose, with hilum punctiform, central.

1144 **DISCUSSION**

1145 The field work revealed the increase of five species and four genera of bamboos not
1146 previously recorded in the Serra do Cachimbo, including three woody bamboos genera
1147 (*Arthrostylidium*, *Eremocaulon* and *Guadua*) and a new species here described
1148 (*Arthrostylidium* sp.). Two specimens previously identified as *Rhipidocladum* sp. (*Souza*
1149 *et al.* 15810 and *Nascimento* 742) were determined, respectively, as *A. verticillatum* and
1150 *Merostachys* sp., another new species also described in this work. Additionally, this paper
1151 unfolds two species registered for the first time in the Pará (*A. simpliciusculum* and *E.*
1152 *capitatum*) and two for the Mato Grosso State (*Pariana radiceflora* and *P. zingiberina*).

1153 The taxonomic treatment revealed the following characters as useful for identification:
1154 synflorescence type, shape and indument of pedicels and spikelet type, length, shape and
1155 apex, especially the indument and number of nerves of the glumes. In woody bamboos,
1156 commonly collected sterile due to the long cycle of flowering (*Judziewicz et al.* 1999),
1157 characters as the presence of an infra/supranodal bands of trichomes in the culms, branch
1158 complement type, culm indument, culm leaf persistence, sheath indument and margins,
1159 blades shape and indument, foliage leaf blades length, shape and indument, and the
1160 presence and shape of auricles and fimbriae are helpful in generic and specific
1161 identification.

1162 The two species of *Pariana* registered in the area have various overlapping morphological
1163 characters, including the terminal spikelet, generally used for identification within the
1164 genus. Further study of the species is necessary to elucidate their delimitations.

1165 All species were found in Open ombrophilous forest, except *Raddiella minima*, whose
1166 type specimen was collected in *Campo rupestre*. *A. verticillatum*, *G. paniculata* and
1167 *Merostachys sp.* were also collected in Anthropized area, along the BR-163. The
1168 following species were also recorded in savanna vegetation: *Eremocaulon capitatum*
1169 (*mata ciliar* in *Cerradão*), *Olyra latifolia* (*mata ciliar* in *Campo Cerrado*) and *Raddiella*
1170 *esenbeckii* (*Campo cerrado* and *Campo rupestre*). The semideciduous seasonal forest and
1171 the deciduous seasonal forest areas from Serra do Cachimbo were not visited.

1172 Despite the collection of twelve of the sixteen species determined, only a small part of
1173 the Serra do Cachimbo was visited (figure 1). This is due to the difficulty of access and
1174 limited resources for covering the entire range of the Serra do Cachimbo.

1175 **CONCLUSIONS**

1176 This work evidenced a richness of bamboos in the study area greater than that previously
1177 represented in herbaria. Taxonomic novelties such as two new species and four new
1178 records for Pará and Mato Grosso States were presented. Most species were collected
1179 only in Open ombrophilous forest, with the exception of four and three species also
1180 registered in savanna environments and anthropized areas, respectively. Despite the
1181 collection effort, only a small part of Serra do Cachimbo was visited and is registered in
1182 the herbaria, due to the limited resources and difficulty of access.

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1228 [atentado-durante-acao-de-fiscalizacao-na-br163](http://www.icmbio.gov.br/portal/ultimas-noticias/20-geral/10027-icmbio-sofre-atentado-durante-acao-de-fiscalizacao-na-br163)). Accessed on 21/09/2019.
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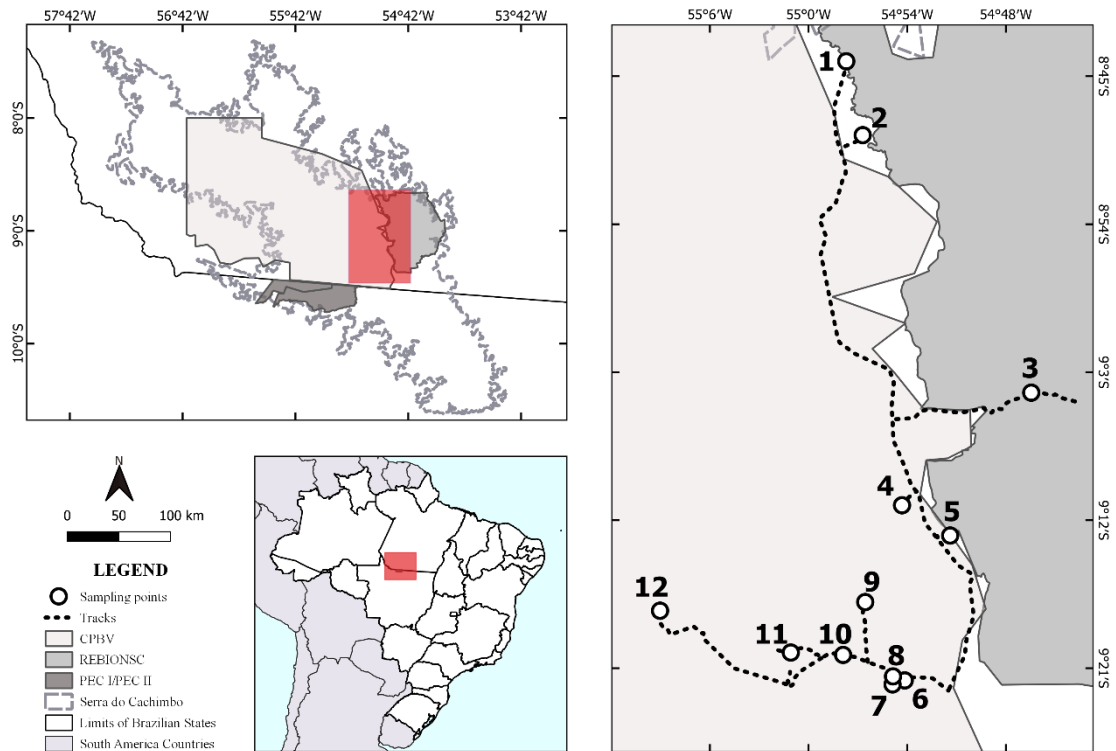
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1315 FIGURES



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1317 **Figure 1.** Geographic location of Serra do Cachimbo with indication of sampling points. Legend:

1318 (1) Curuá Waterfall; (2) Areia Alto da Serra Company; (3) Main Road of REBIONSC; (4) Braço

1319 Norte River source; (5) Carrefour farm; (6) Toca das Ariranhas; (7) Olho d'água; (8) CPBV

1320 headquarter; (9) Shooting stand; (10) CPBV airport; (11) Formiga River bridge; (12) Harpy eagle

1321 waterfall.

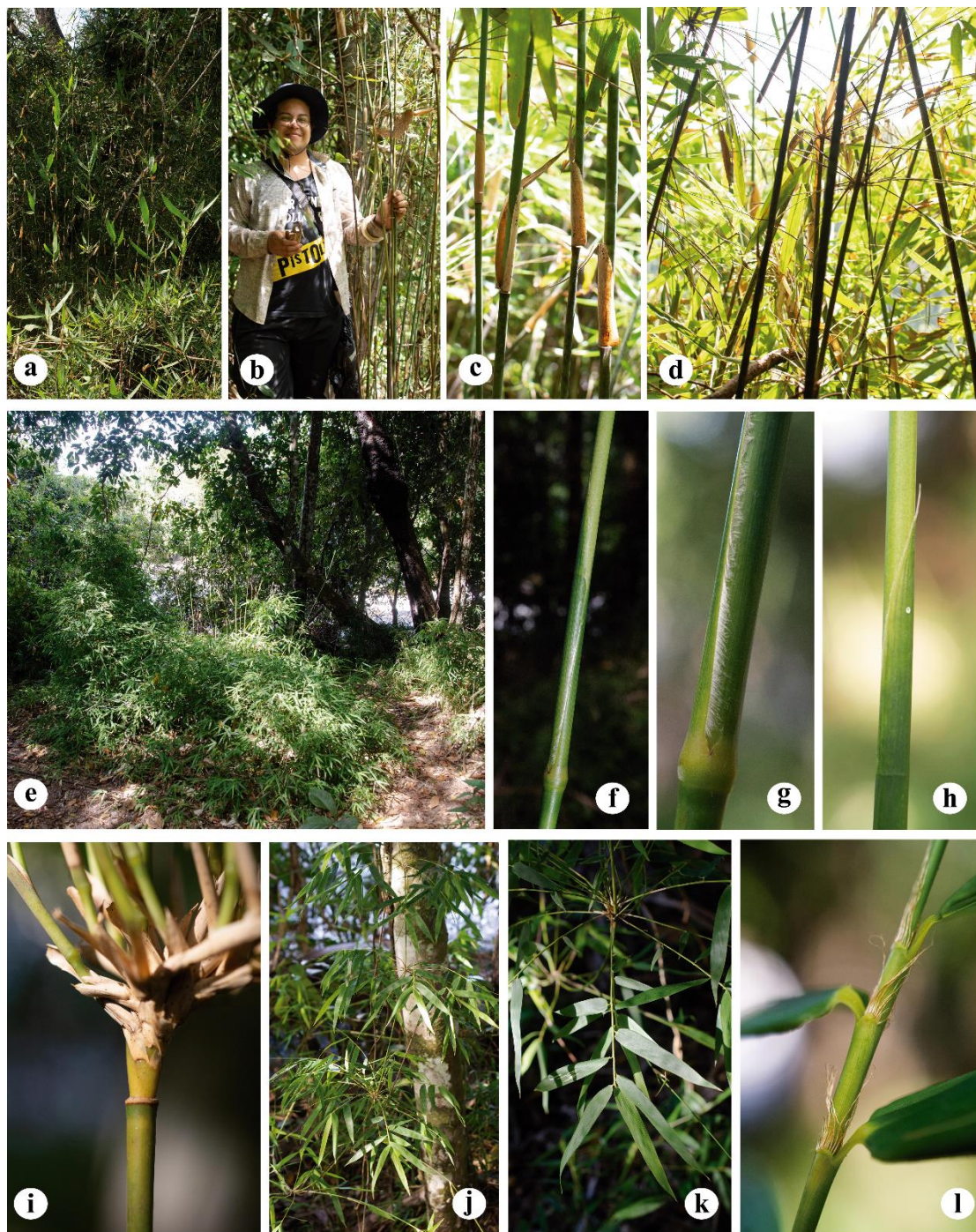
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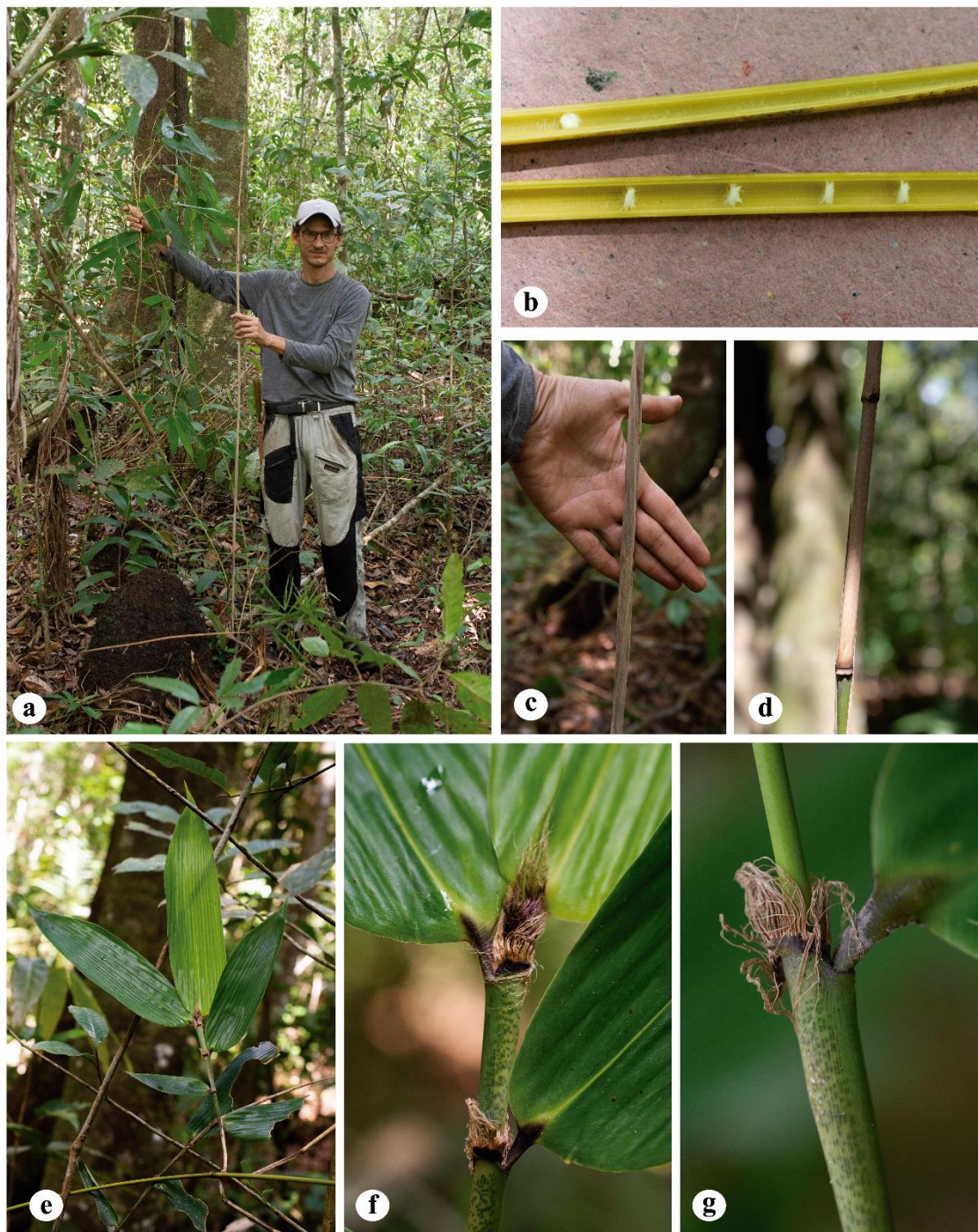
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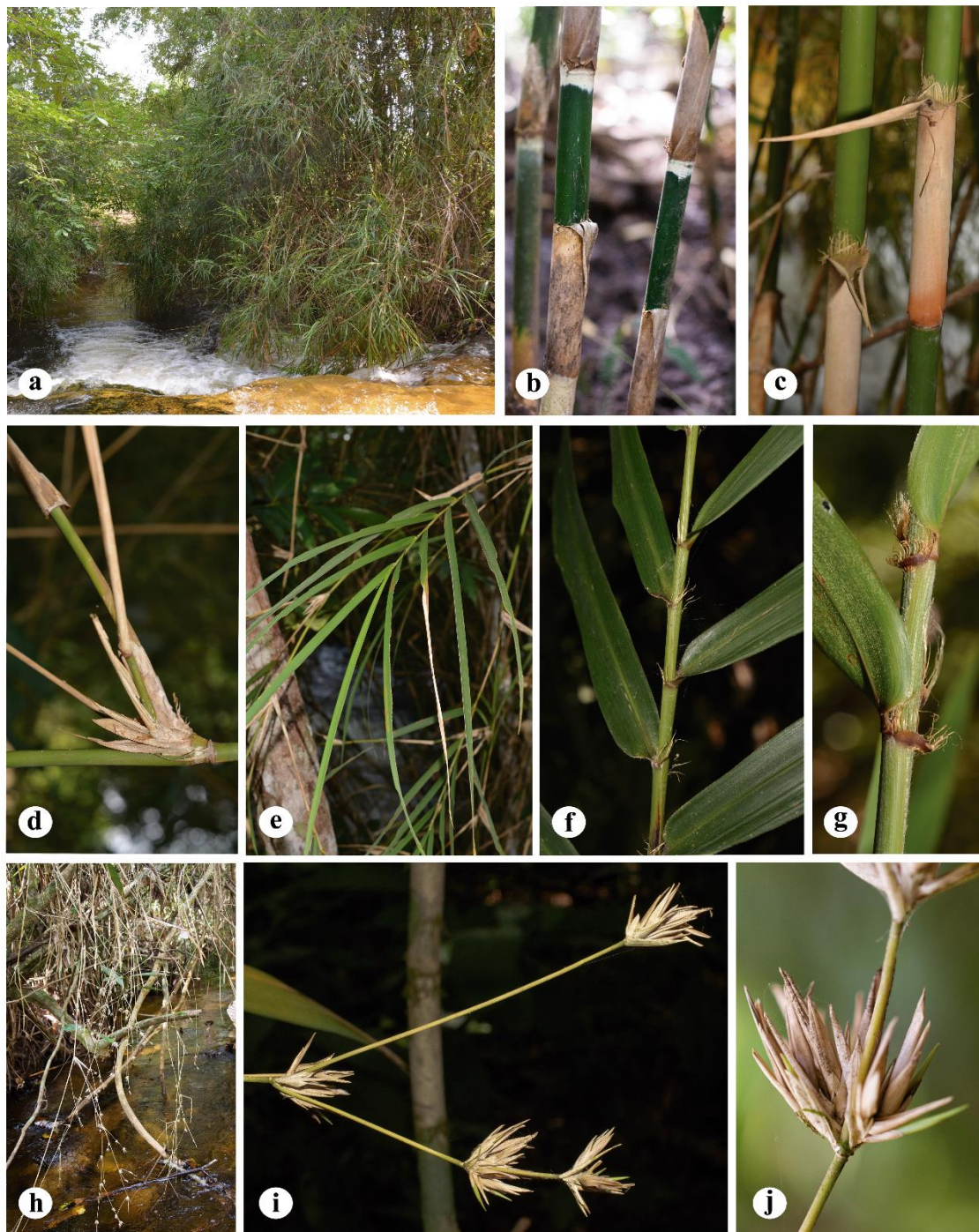
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1328 **Figure 2.** Field photographs of Bamboos from Serra do Cachimbo. *Actinocladum verticillatum*
 1329 (*Maciel-Silva et al. 504*): a-b. Habit. c. Culm leaves. d. Branch complement; and *Arthrostylidium*
 1330 *simpliciusculum* (*Lopes-Neto et al. 772*): e. Habit. f. Culm leaves. g. Detail of the culm leaf
 1331 margins ciliate. h. Detail of the culm leaf apex aristate. i. Branch complement. j-k. Foliage leaves
 1332 complement. l. Detail of the fimbriae in foliage leaves. Photos: P.L. Viana.



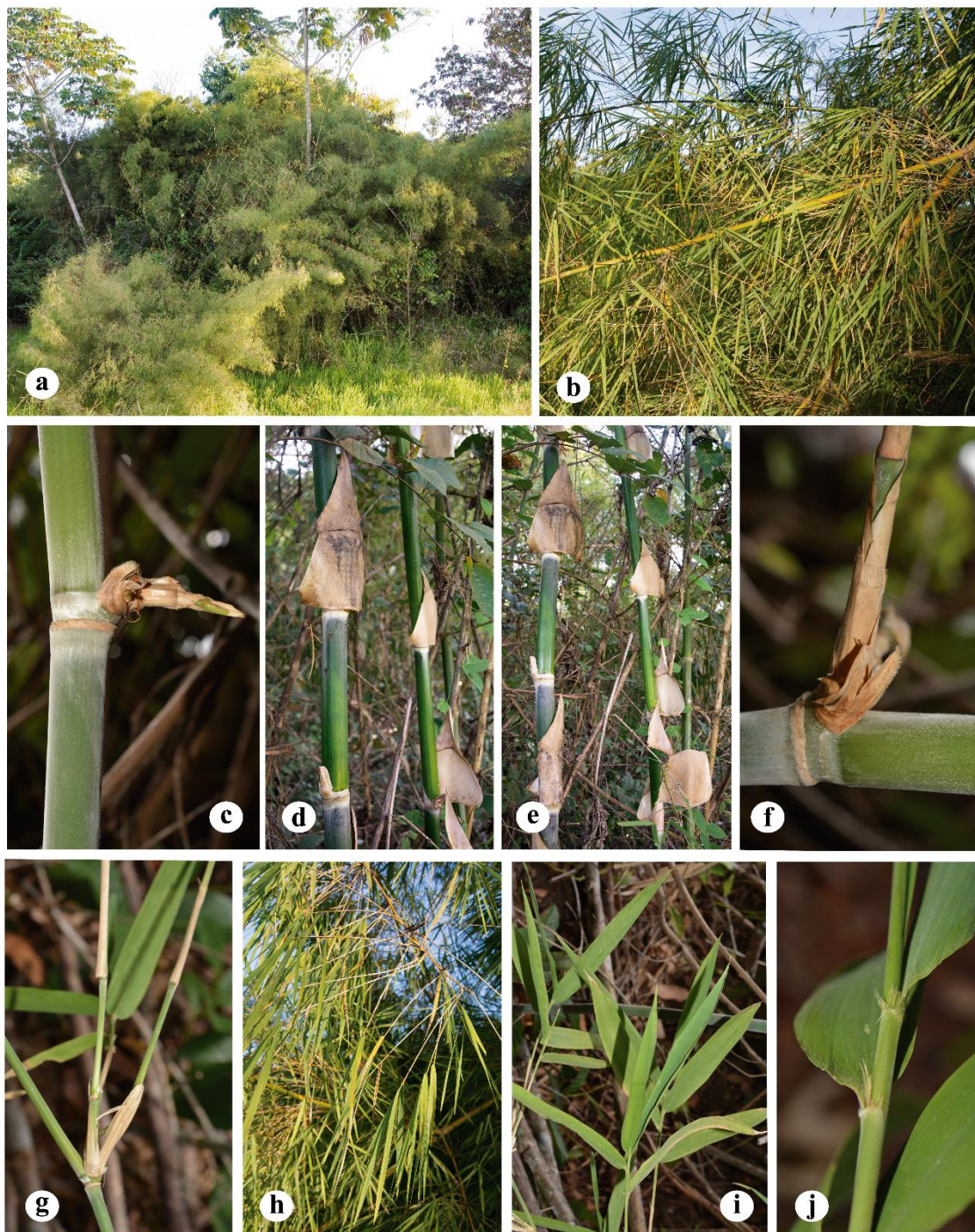
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1334 **Figure 3.** Field photographs of Bamboos from Serra do Cachimbo. *Arthrostylidium* sp. (Lopes-
 1335 Neto et al. 782): a. Habit. b. Detail of the membranous septum in the lumen. c-d. Detail
 1336 of the culm leaves larger than the internodes. e. Branch complement. f-g. Detail of the
 1337 foliage leaves fimbriae. Photos: A.S.B. Gil: a. P.L. Viana: b-g.



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1339 **Figure 4.** Field photographs of Bamboos from Serra do Cachimbo. *Eremocaulon capitatum*: a.
 1340 Habit. b. Infranodal band of white trichomes. c. Culm leaves. d. Branch complement. e. Foliage
 1341 leaves. f. Foliage leaf blades detail. g. Foliage leaf fimbriae detail. h. Flowering culms. i.
 1342 Synflorescence detail. j. Pseudospikelet detail. Photos: M. Pastore: a, c-e (Maciel-Silva et al. 478),
 1343 f (Pastore et al. 1133), g (Pastore et al. 1185); P.L. Viana: b, h-j (Lopes-Neto et al. 683).



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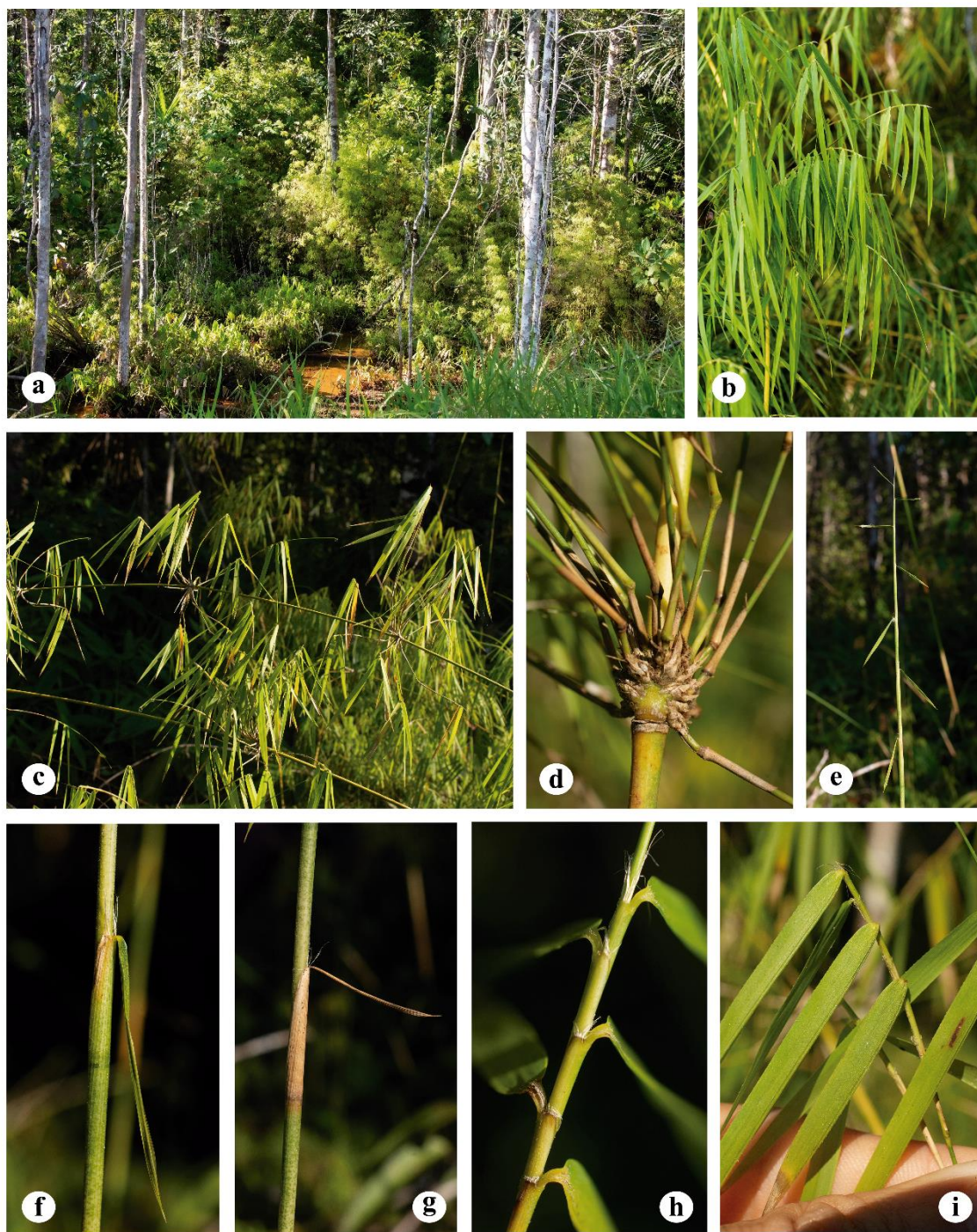
1345 **Figure 5.** Field photographs of Bamboos from Serra do Cachimbo. *Guadua paniculata*: a. Habit.

1346 b. Detail of the culms. c. Detail of the infra- and supranodal bands of trichomes and thorns. d-e.

1347 Culm leaves caducous. f-g. Branch complement. h.i. Foliage leaf complement j. Detail of the

1348 foliage leaf fimbriae. Photos: M. Pastore: c, f, g, i-j (*Pastore et al. 1200*); P.L. Viana: a-b, d-e, h

1349 (*Lopes-Neto et al. 763*).



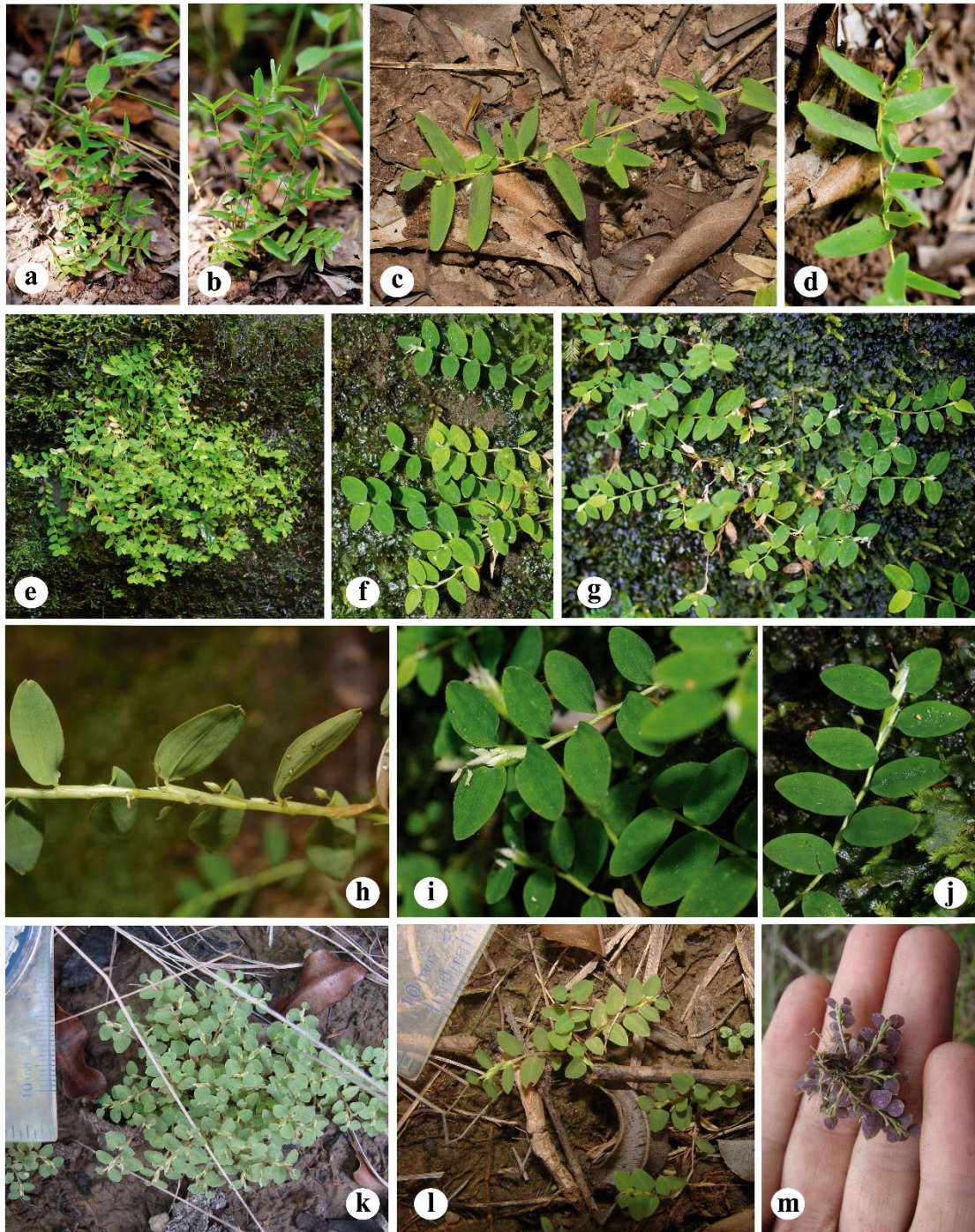
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1351 **Figure 6.** Field photographs of *Merostachys* sp. (Lopes-Neto et al. 693). a. Habit. b. Detail of the
 1352 foliage leaves. c. Detail of the culm. d. Branch complement. e. Apex of the culm with culm leaves.
 1353 f-g. Culm leaves. h. Foliage leaves fimbriae. i. Foliage leaves blades reflexed with prominent
 1354 scabrous nerves on one side. Photos: P.L. Viana.



1355

1356 **Figure 7.** Field photographs of Bamboos from Serra do Cachimbo. *Olyra caudata* (Lopes-Neto et al. 685): a. Flowering
 1357 culm. b-c. Synflorescence detail. *Olyra latifolia* (Lopes-Neto et al. 677): d. habit. e-f. Synflorescence detail. *Olyra*
 1358 *taquara* (Lopes-Neto et al. 638): g-h. Habit. i. Dying plants after flowering. j. Detail of the leaves. k. Synflorescence
 1359 detail. l. Detail of the female spikelets. *Parodiolyra luetzelburgii* (specimen from Serra dos Carajás, Oliveira 2330
 1360 (HUEFS, MG)): m. Habit. n. Synflorescence detail. Photos: P.L. Viana.



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1362 **Figure 8.** Field photographs of Bamboos from Serra do Cachimbo. *Raddiella esenbeckii* (Lopes-Neto et al.
 1363 767): a-b. Habit. c. Detail of the culms. *R. malmeana* (Lopes-Neto et al. 567: h. Lopes-Neto et al. 751: e-g,
 1364 i-j): e. Habit. f-g. Detail of the culms. h. Axillary synflorescences with female spikelets. i-j. Terminal
 1365 synflorescences with male spikelets. *R. minima* (specimen from Catanuma, Amazonas, P.L. Viana et al.
 1366 2634): k. Habit. l-m. Detail of the culms. Photos: P.L. Viana.

4. CONSIDERAÇÕES FINAIS

Esse trabalho evidenciou uma alta diversidade de Poaceae na área de estudo, quando comparado com outras regiões na Amazônia onde a flora agrostológica foi listada. Entre as subfamílias registradas, Panicoideae e Bambusoideae possuem maior riqueza e foram encontradas majoritariamente em ambientes savânicos e florestais, respectivamente. O estudo taxonômico dos bambus revelou uma diversidade maior do que a anteriormente representada nos herbários, além de novidades taxonômicas como quatro novas ocorrências e duas espécies possivelmente novas para a ciência. Ao todo, foram identificadas dezesseis novas ocorrências, sendo oito também novas ocorrências para o bioma Amazônico. Em suma, os resultados encontrados representam um esforço amostral e material dos herbários provenientes de uma pequena parte da Serra do Cachimbo, devido a dificuldade logística e recursos limitados. Um estudo mais aprofundado da região é necessário, para preencher lacunas no conhecimento da comunidade vegetal e suas fitofisionomias.

ANEXO

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11. IMPORTANT NOTE: Manuscripts not properly formatted according to the "Instructions to Authors" are NOT accepted for publication.

FORMAT AND STYLE

12. The manuscript is to be prepared with a text editor (e.g. doc or docx), typed using "Times New Roman" 12-point font. It should be double-spaced with 3-cm margins; pages and lines consecutively numbered. For tables see Item 8d.

13. Title. Adjust to the left and capitalize the first letter of the sentence. Avoid using scientific names.

14. Abstract. It should have up to 250 words (150 for short communications). Initiate the Abstract with a couple of lines (rationale), and after that clearly state the objectives. The Abstract must succinctly contain the methodology, results and conclusions, emphasizing important aspects of the study. It should be intelligible for itself. Scientific names of species and other Latin terms should be in italic. Avoid acronyms, but if they are required give their meaning. Do not use references in this section.

15. Keywords. They must consist of four or five terms. Each keyword term may consist of two or more words. However, words used in the title cannot be repeated as keywords.

16. Introduction. This section should emphasize the purpose of the study. It should convey an overview of previous relevant studies, as well as clearly state the objectives or hypotheses to be tested. This section is expected not to exceed 35 lines. Do not anticipate data or conclusions of the manuscript and do NOT include subtitles in this section. End the Introduction with the objectives.

17. **Materials and Methods.** This section should contain enough information, chronologically organized to explain the procedures carried out, in such a way that other researches can be able to repeat the study. Statistical treatments of data should be described. Standard techniques need only be referenced. Measuring units and their abbreviations should follow the International System and, when necessary, should include a list of the abbreviations utilized. Specific instruments used in the study should be described (model, manufacturer, city and country of manufacturing, in parentheses). For example: "Photosynthesis was determined using a portable gas exchange system (Li-6400, Li-Cor, Lincoln, NE, USA)". Voucher material (sample for future reference) should be deposited in one or more scientific collections and informed in the manuscript. Do NOT use sub-subtitles in this section. Use bold, but not italic or uppercase letters for subtitles.

18. **Ethics and legal aspects:** For studies that requires special permissions (e.g. Ethic Committee/National Commission of Ethic in Research-CONEP, IBAMA, SISBIO, CNPq, CNTBio, INCRA/FUNAI, EIA/ RIMA, others) the registration/approval number (and publishing date) must be informed. Authors are responsible to follow all specific regulations on this issue.

19. **Results.** This section should present a concise description of information obtained, with a minimum of personal judgment. Do not repeat in the text all the data contained in tables and illustrations. Do not present the same information (data) in tables and figures simultaneously. Do not use sub-subtitles in this section. Numeral should be one space-separated from units. For example, 60 °C and NOT 60°C, except for percentages (for instance, 5% and NOT 5 %).

Units: Use units and symbols of the International System. Use negative exponents instead of slash (/). For example: cmol kg^{-1} instead of $\text{meq}/100\text{g}$; m s^{-1} instead of m/s . Use space instead of point between symbols: m s^{-1} instead of m.s^{-1} . Use a dash (NOT a hyphen) to denote negative numbers. For example: -2, instead of -2. Use kg instead of Kg and km instead of Km.

20. **Discussion.** The discussion should focus on results obtained. Avoid mere speculation. However, well based hypotheses can be incorporated. Only relevant references should be included.

21. **Conclusions.** This section should contain a concise interpretation of main results and a final message, which should highlight the scientific implications of the study. Write the conclusions in a separate section (one paragraph).

22. **Acknowledgements** should be brief and concise. Include funding agency. Do NOT abbreviate names of institutions.

23. **References.** At least 70% of references must be scientific journal articles. Citations should preferentially be from last 10 years. It is suggested not to exceed 40 references. They should be cited in alphabetical order of author names, and should be restricted to citation included in the text. If a reference has more than ten authors, use only the six first names and *et. al.* In this section, the journal title is NOT abbreviated. See the examples below:

a) Articles from periodicals:

Villa Nova, N.A.; Salati, E.; Matsui, E. 1976. Estimativa da evapotranspiração na Bacia Amazônica. *Acta Amazonica* 6: 215-228.

Articles from periodicals that do not follow traditional pagination:

Ozanne, C.M.P.; Cabral, C.; Shaw, P.J. 2014. Variation in indigenous forest resource use in Central Guyana. *PLoS ONE* 9: e102952.

b) Dissertations and theses:

Ribeiro, M.C.L.B. 1983. *As migrações dos jaraquis (Pisces: Prochilodontidae) no rio Negro, Amazonas, Brasil*. Dissertação de Mestrado, Instituto Nacional de Pesquisas da Amazônia/Fundação Universidade do Amazonas, Manaus, Amazonas. 192p.

c) Books:

Steel, R.G.D.; Torrie, J.H. 1980. *Principles and procedures of statistics: a biometrical approach*. 2nd ed. McGraw-Hill, New York, 633p.

d) Book chapters:

Absy, M.L. 1993. Mudanças da vegetação e clima da Amazônia durante o Quaternário. In: Ferreira, E.J.G.; Santos, G.M.; Leão, E.L.M.; Oliveira, L.A. (Ed.). *Bases científicas para estratégias de preservação e desenvolvimento da Amazônia*. v.2. Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, p.3-10.

e) Citation of electronic Source:

CPTEC, 1999. Climanalise, 14: 1-2 (www.cptec.inpe.br/products/climanalise). Accessed on 19/05/1999.

f) Citations with more than ten authors:

Tseng, Y.-H.; Kokkotou, E.; Schulz, T.J.; Huang, T.L.; Winnay, J.N.; Taniguchi, C.M.; *et al.* 2008. New role of bone morphogenetic protein 7 in brown adipogenesis and energy expenditure. *Nature* 454: 1000-1004.

24. Citations in the text. Citations of references follow a chronological order. For two or more references from the same year cite according to alphabetical order. Please see the following examples.

a) One author:

Pereira (1995) or (Pereira 1995).

b) Two authors:

Oliveira and Souza (2003) or (Oliveira and Souza 2003).

c) Three or more authors:

Rezende *et al.* (2002) or (Rezende *et al.* 2002).

d) Citations from different years (chronological order):

Silva (1991), Castro (1998) and Alves (2010) or (Silva 1991; Castro 1998; Alves 2010).

e) Citations in the same year (alphabetical order):

Ferreira *et al.* (2001) and Fonseca *et al.* (2001); or (Ferreira *et al.* 2001; Fonseca *et al.* 2001).

FIGURES

25. Photographs, drawings and graphics should have high definition, with high black and white contrast. Do NOT use grey tones in scatter graphs or bar charts. In scatter graphs use black (solid, dotted or dashed) lines and open or solid (circle, square, triangle or diamond) symbols. For bar charts, black, white, stripped or dotted bars can be used. Border the plotting area with a thin solid line, but do NOT use a border line in the graphic area. Label each panel of a composite figure (multiple panels) with an uppercase letter inside the plotting area, in the upper right-hand corner.

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TABLES

32. Tables should be well organized and numbered sequentially with Arabic numerals. The numbering and the table title (legend) should be at top of the table. A table may have footnotes. The meaning of symbols and acronyms used in the table (e.g. head columns, etc.) **MUST** be defined in the table title. Use horizontal lines above and below the table, and for separating the heading from the main body of the table. Do NOT use vertical lines.

33. Tables should be generated using a text editor (e.g. doc or docx), and should NOT be inserted in the manuscript as an image (e.g. in JPG format).

34. Table citations in the text can be made directly or indirectly (in parentheses), with the initial letter capitalized. For example: Table 1 or (Table 1). In the table legend, the table number should be followed by a period, for instance: "Table 1. Analysis...". Tables should be self-explanatory.

ADDITIONAL INFORMATION

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