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Amaioua longipedicellata (Rubiaceae, Gardenieae),
a new species from the Brazilian Atlantic coast

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INTRODUCTION

According to several phylogenetic studies using morphological and molecular data (Persson 1996, 2000a, 2000b, Andreasen & Bremer 1996, Bremer & Eriksson 2009, Mouly et al. 2014) the tribe Gardenieae, as traditionally recognized, is paraphyletic, and its Neotropical genera are found in three groups: (1) Alibertia group, (2) Randia group, and (3) Genipa, positioned in a clade of mostly Paleotropical genera. Mouly et al. (2014), according to the molecular phylogenies obtained, described the new tribe Sherbournieae (where they included the Paleotropical genera Atractogyne Pierre, Mitrostigma Hochst., Oxyanthus DC., and Sherbournia G.Don), and resurrected the tribe Cordiereae, which corresponds to the Alibertia group. However, Persson & Delprete (2017) considered that in the phylogenies of Mouly et al. (2014) the resolution between the two groups is low, and treated the formal recognition as tribes as premature; therefore, they preferred to call the latter ensemble of genera the Alibertia group, a delimitation and a name that is here maintained. The molecular phylogenetic analyses of Cortés-B. et al. (2009) and Mouly et al. (2014) showed that the Alibertia group includes 12 genera. Persson & Delprete (2017) confirmed the same number of genera, and esteemed that the group includes about 110 species. In their monographic treatment of the Alibertia group, they provided an expanded discussion of the morphological features, phenology and ecology of the taxa of the group, along with the first part of the taxonomic revision, namely the genera Agouticarpa C.H.Perss., Alibertia A.Rich., Cordiera A.Rich., Melanopsisidium Colla, Ridocea Delprete, and Stenosepala C.H.Perss.

Background – Ongoing studies of Brazilian Rubiaceae revealed an undescribed species of Amaioua endemic to Atlantic Forest (Restinga and Semideciduous forest) of the state of Bahia, which is here described and illustrated, and its morphological characters are discussed and compared with those of similar species.

Methods – This study is based on examinations of herbarium specimens, samples preserved in 60% ethanol, field observations, and digital images. Herbarium specimens of the CAY, CEPEC, HBR, IBGE, K, MBM, NY, RB, U, UB, UFG, and US herbaria were directly studied. Additional images of herbarium specimens were studied online.

Results – Amaioua longipedicellata Delprete & J.G.Jardim is here described, illustrated and compared with the two most similar species, i.e., A. glomerulata (Lam. ex Poir.) Delprete & C.H.Perss. and A. intermedia Mart. A table comparing the morphological characters of these three species, and an appendix with selected specimens studied of A. glomerulata and A. intermedia are included.

Key words – Duroia, Alibertia Group, Neotropics, Bahia, Brazil, Restinga.

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Amaioua Aubl. (Aublet 1775) and Duroia L.f. (Linné 1782) are unique within the Alibertia group, in having stipules as a conical apical cap, readily caducous, or rarely remaining on the stem and splitting on one side; these two genera are quite similar to each other and are frequently confused. They have been traditionally separated by the number of flowers per female inflorescence, although with overlapping ranges, being with $1–3(–5)$ flowers in Duroia, and with $(1–)2–7$ flowers in Amaioua (e.g. Steyermark 1974 Taylor et al. 2004, Delprete 2010, Persson & Delprete 2017). In the molecular phylogenies of Persson (2000a, 2000b), Amaioua and Duroia were found on a strongly supported clade, the former, represented by a single species, nested within the latter. Since the name Amaioua has priority over Duroia, if the two genera will eventually be treated as synonymous, the previous name is the one to be adopted. For the purpose of this study, we maintain the two genera separated and as currently delimited.

Ongoing studies of Brazilian Rubiaceae revealed an undescribed species of Amaioua, with fasciculate, 2–3-flowered, or rarely trichotomous, 3–9-flowered female inflorescences, and oblong-elliptic, 1.2–2.2 cm long berries, differing from similar species by the thin, long pedicels, among other characters. This new species is endemic to Restinga vegetation and semideciduous seasonal forest (Mun. Jequié) of the state of Bahia, coastal Brazil.

Restinga vegetation occurs on sandy deposits present along the Atlantic coast of Brazil, which accumulated during the Quaternary Period, when the sea level went through considerable fluctuations. Restinga is characterized by sandy or clay-sandy soils, poor in nutrients. Two main types are recognized: shrubby Restinga (“Restinga arbustiva”) and arboreal Restinga (“Restinga arborea”). Arboreal Restinga, where the present new species is found, is a forest formation composed by dense small trees and with a closed canopy (Thomas & Barbosa 2008). It is an edaphic formation related to the sandy Quaternary lowlands located between the sandy beaches and the first slopes parallel to the coast (Vinha et al. 1976).

Semideciduous seasonal forest is a vegetation type occurring in the transitional zone present between the Atlantic Forest and the Caatinga Biome. It is characterized by a well-marked dry season (winter season) and an intense rainy season (summer season). During the dry season, a considerable portion of the trees (between 20% and 50% of the species) lose their leaves (Veloso et al. 1991). It is characterized by sandy-clay soils. According to Vinha et al. (1976), this forest is composed by dense patches of small trees averaging 10–12 m in height. According to the latter authors, this vegetation is strongly threatened by aggressive cattle ranching, which represent the principal cause of the disappearance of its last remnants.

**MATERIAL AND METHODS**

This study is based on examinations of herbarium specimens, samples preserved in 60% ethanol, field observations, and digital images. Herbarium specimens were studied either by visiting and/or through loans from the CAY, CEPEC, HBR, IBGE, K, MBM, NY, RB, U, UB, UFG, and US herbaria. Additional images of herbarium specimens were studied through the following websites: Jstor Global Plants (https://plants.jstor.org/), Tropicos (http://www.tropicos.org/), and INCT – Herbário Virtual da Flora e dos Fungos (http://inct.splink.org.br/). Descriptions and measurements are based on dry herbarium specimens. All specimens cited have been examined, unless indicated by “n.v.” (not seen) after the herbarium acronym. The abbreviation “Mun.” in the specimens cited refers to the Brazilian municipalities. A preliminary extinction risk assessment of the new species was made using the IUCN Red List Categories and Criteria (IUCN 2012, 2017). Georeferenced specimen data were imported into GeoCAT (Bachman et al. 2011) to estimate the area of occupancy (AOO) and the extent of occurrence (EOO).

**SPECIES DESCRIPTION AND DISCUSSION**

*Amaioua longipedicellata* Delprete & J.G.Jardim, sp. nov.

The new species is most similar to *A. glomerulata* (Lam. ex Poir.) Delprete & C.H.Perss. (Delprete & Persson 2012) in the stipules densely antrorse-sericeous outside and glabrous inside, subcoriaceous leaf blades, female inflorescences fasciculate (rarely cymose, trichotomous in *A. longipedicellata*), and calyx with linear lobes; the former differs from the latter by the male inflorescences with a thin rachis (vs. stout in *A. glomerulata*), 3–9–flowered (vs. 15–35–flowered), female inflorescences fasciculate, 2–3–flowered, or rarely trichotomous, 3–9–flowered (vs. cymose, with 2–3 pairs of lateral branches, 6–24–flowered), female flowers pedicellate (vs. sessile), smaller corollas (vs. larger), infructescence fasciculate, with 2–3 fruits, or rarely cymose, with 3–9–fruits (vs. cymose, with 3–10(–13) fruits), and fruits pedicellate, oblong-ellipsoid (vs. sessile, ellipsoid). For additional differences see table 1. – Type: Brazil, Bahia, Mun. Una, Rod. BA-001, Ilhéus–Una, estrada para Pedras de Una, ca. 500 m da BR-001, restinga arbórea, tree ca. 6 m tall, leaves dark green and shiny above, pale green below, calyx pale green, corollas white, immature fruits green, 15°16′13″S, 39°02′58″W, 40 m, 11 Jan. 2016, J.G. Jardim & P.G. Delprete 6800, female fl, imm fr (holo.: CEPEC [fl, imm fr]; iso.: ALCB [imm fr], EAC [imm fr], MBM [imm fr], MBML [imm fr], UEC [imm fr], SPF [fl, imm fr], RB [fl buds, imm fr], HURB [imm fr]).

Shrub 2.4–4 m tall or tree 3.5–14 m tall; trunk to 15 cm at dbh; bark fissurate; young branches terete, subterete to laterally compressed, 2–3 mm thick, antrorse to spreading sericeous, later glabrate; bark pale brownish-gray, fissurate; wood white, Stipules an apical cap, conical, 8–22(–31) mm long, readily caducous, rarely remaining on the stem and splitting on one side, densely antrorse-sericeous outside, trichomes rust-brown, glabrous inside, with a basal portion with colleters inside, leaving a circular scar after falling off. Leaves opposite (rarely ternate in young plants), often clustered at branch tips; petioles 7–27 mm long, antrorse appressed-pubescent to glabrate; blades ovate to elliptic, 5–18 × 2.5–8 cm, obtuse at base, obtuse to acute and acuminate at apex, subcoriaceous (to thinly fleshy when fresh), glabrous and lucid above, glabrous below, margins not thickened, glabrous, flat (not revolute); secondary veins 5–8 on each side of midrib; domatia of sparse short trichomes present at secondary vein axils. Male inflorescence sessile to

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subsessile, cymose, commonly trichotomous, 3–9-flowered, each branch ending with a 1–3-flowered cymule; flowers long-pedicellate. Female inflorescence sessile to subsessile, fasciculate, 2–3-flowered, or rarely trichotomous, 3–9-flowered, each branch ending with a 1–3-flowered cymule; flowers long-pedicellate. Flowers strongly fragrant, reminding of gardenia scent. Male flowers: pedicels 9–12 mm long, thin; ovary lacking; calyx cupular, 4–6 mm long, 6–7-lobed, pale green, antrorse appressed-sericeous outside and inside, lobes linear, 1–1.3 mm long; corolla 11–12.5 mm long, white to yellowish-white, tube 6.5–7 mm long, densely antrorse white-sericeous outside, glabrous inside, lobes 6–7, oblong-lanceolate, 4.5–5.5 mm long, acute, sparsely white-sericeous outside, glabrous to sparsely white-sericeous inside; stamens included, sessile, inserted at median portion of the corolla tube; anthers narrowly oblong, tips almost at the same height of the corolla mouth, 4–4.5 mm long, apiculate; style not receptive, included, 6–6.5 mm long, glabrous, style branches 2, connivent, longitudinally ridged, 3–3.5 mm long. Female flowers: pedicels 7–12 mm long, thin; hypanthium oblong-turbinate, 3.5–4 × 1.5 mm, densely antrorse white-sericeous; calyx cupular, 3.5–4.5 mm long, 5–7-lobed, pale green, sparsely antrorse appressed-sericeous outside and inside, lobes linear, 0.7–1 mm long, sometimes alternate to smaller lobes teeth 0.3–0.5 mm long; corolla 10.5–13.5 mm long, white to yellowish-white, tube 5.5–7 mm long, densely antrorse white-sericeous outside, glabrous inside, lobes 6–7, oblong-lanceolate to lanceolate, 5–7 mm long, acute, sparsely white-sericeous outside, glabrous to sparsely white-sericeous inside; stamens included, sessile, inserted at median portion of the corolla tube; anthers narrowly oblong, with tips below the corolla mouth, 4–4.5 mm long, apiculate; style receptive, included (sometimes with lobe tips barely above the corolla mouth), 4.5–7 mm long, glabrous, style branches

### Table 1 – Morphological comparison of Amaioua glomerulata, A. intermedia and A. longipedicellata.

|                          | A. glomerulata | A. intermedia | A. longipedicellata |
|--------------------------|----------------|---------------|---------------------|
| Leaf secondary veins on each side of midrib | 6–10           | (4–)5–7(–9)   | 5–8                 |
| Rachis thickness         | Stout          | Stout         | Thin                |
| Male inflorescence       | Cymose, 1–3(4)-branched, 15–35-flowered, each branch ending with a 3–many-flowered cymule | Cymose, trichotomous, 10–35-flowered, each branch ending with a 3–15-flowered cymule | Cymose, commonly trichotomous, 3–9-flowered, each branch ending with a 1–3-flowered cymule |
| Female inflorescence     | Pedunculate, fasciculate, 6–24-flowered, with 2–3 short branches | Sessile to subpedunculate, fasciculate, 5–9-flowered | Sessile to subpedunculate, fasciculate, 2–3-flowered, or rarely trichotomous, 3–9-flowered, each branch ending with a 1–3-flowered cymule |
| Male pedicels            | Absent or stout, to 4 mm long | Stout, 5–12 mm long | Thin, 9–12 mm long |
| Male calyx               | 3.5–4 mm long, lobed; lobes 1–3 mm long | 4–6 mm long, truncate to undulate | 4–6 mm long, lobed; lobes linear, 1–1.3 mm long |
| Male corolla             | 19–26 mm long; tube 8–10 mm long; lobes ligulate to narrowly triangular, 11–16 mm long | 16–22 mm long; tube 8–10 mm long; lobes oblong-lanceolate, 8–12 mm long | 11–12.5 mm long; tube 6.5–7 mm long; lobes oblong-lanceolate, 4–5.5 mm long |
| Female pedicels          | Absent         | Stout, (2.5–)5–12 mm long | Thin, 7–12 mm long |
| Female calyx             | 3 mm long, lobed; lobes linear, 1–2 mm long | 4–6 mm long, truncate to undulate | 3.5–4.5 mm long, lobed; lobes linear, 0.7–1 mm long, sometimes alternate to smaller lobes (0.3–0.5 mm long) |
| Male flowers             |                |               |                     |
| Female corolla           | 12–15 mm long; tube 7–8 mm long, antrorsely golden-sericeous outside; lobes narrowly triangular, 5–7 mm long | 17–23 mm long; tube 8–9 mm long, antrorsely golden-sericeous outside; lobes oblong-lanceolate, 9–14 mm long | 10.5–13.5 mm long; tube 5.5–7 mm long, densely antrorse white-sericeous outside; lobes oblong-lanceolate to lanceolate, 5–7 mm long |
| Infructescence           | Sessile, subsessile or subpedunculate, fasciculate, with 3–10(–13) fruits | Sessile, subsessile or subpedunculate, fasciculate, with 5–9 fruits | Sessile or subsessile, fasciculate, with 2–3 fruits, or rarely trichotomous, with 3–9 fruits, each branch ending with a 1–3-fruited cymule |
| Fruit pedicels           | Absent         | Stout, (2.5–)3–22 mm long | Thin, 25–40 mm long |
| Fruit shape and size     | Ellipsoid, 1.3–1.5 × 0.7–1.1 cm | Oblong to ellipsoid, 2.5–3.5 × 0.8–1.1 cm | Oblong-ellipsoid, 1.2–2.2 × 0.7–1 cm |
| Geographic distribution  | Neotropics (from Mexico and Antilles to Peru) | Extra-Amazonian Brazil (from Bahia to Santa Catarina) | Northeastern Brazil (endemic to Bahia) |
Figure 1 – *Amaioua longipedicellata*: A, branchlet with male inflorescence; B, branchlet with fasciculate female inflorescence; C, fasciculate infructescence with immature fruits; D, trichotomous infructescence with mature fruits; E, Male flower in anthesis; F, dissected male flower in anthesis; G, female flower in anthesis; H, dissected female flower in anthesis. A, E & F from *Jardim & Delprete* 6802 (CEPEC); B & C from *Jardim & Delprete* 6801 (CEPEC); D from photograph by J. Jardim (see fig. 2F); G & H from *Jardim & Jardim* 5447 (CEPEC). Illustration by Piero Delprete.
Figure 2 – *Amaionta longipedicellata*: A, habit (tree c. 5 m tall); B, stipule; C, fissurate bark; D, cymose male inflorescence; E, fasciculate female inflorescence; F, trichotomous infructescence with fruits at intermediate stage of maturity. Photos A–E by Piero Delprete. Photo F by Jomar Jardim.
Infructescence sessile or subsessile, fasciculate, with 2–3 fruits, or rarely cymose, trichotomous, with 3–9 fruits, each branch ending with a 1–3-fruited cymule. Berries with pedicels 25–40 mm long, oblong-ellipsoid, 1.2–2.2 × 0.7–1 cm, obtuse at base, crowned by the permanent calyx, sparsely short white-sericeous and reddish at initial stage of ripening, dark purple and glabrate at full maturity. Seeds round in outline, 3–4 × 4–5 mm, convex on both sides, reddish-brown; testa papillose.

Distribution – Mostly found along the Brazilian Atlantic coast, in the state of Bahia (fig. 3).

Additional specimens studied (paratypes) – Brazil: Bahia: Mun. Una, Reserva Biológica do Mico-Leão (IBAMA), entrada no km 46 da Rod. BA-001 Ilhéus–Una, 15°09′S, 39°05′W, 13 Sep. 1993, Amorim et al. 1346, imm fr (CEPEC, NY); ibid., 28 Nov. 1993, Amorim et al. 1561, fl (CEPEC); Mun. Maraú, 6 May 1966, Belém & Pinheiro 2041, fl (UB); Maraú, 12 Jan. 1967, Belém & Pinheiro 3075, fl (UB); Maraú, mata costeira, 13 Jan. 1967, Belém & Pinheiro 3107, fl (CEPEC, NY, UB); Mun. Valença, Estrada Valença-Guaíbim, km 10, 8 Jan. 1982, Carvalho & Lewis 1126, fl (CEPEC); Mun. Maraú, Estrada Ubaitaba-Ponta do Mutá, entre o km 0 e km 1 da Estrada, 3 Feb. 1983, Carvalho & Plowman 1416, fr (CEPEC, MBM, HUEFS, UB); Mun. Una, ca. 50 km S of Ilhéus, on road to Una, 15°02′S, 39°01′W, 20 m, 15 Nov. 1992, Hind et al. 43, imm fr (CEPEC); Mun. Una, Reserva Biológica do Mico-Leão (IBAMA), entrada no km 46 da Rod. BA-001 Ilhéus–Una, Picada do Marimbondo, 15°09′S, 39°05′W, 23 Feb. 1999, Jardim et al. 2022, imm fr (CEPEC); Mun. Una, Rod. BA-001 Una-Ilhéus, estrada para o povoado de Pedras de Una, 500–700 m da rodovia, 16°12′S, 39°03′6″W, 65 m, 23 Dec. 2008, Jardim & Jardim 5447, female fl (CEPEC); Mun. Ilhéus, Rod. Olivença para o distrito de Sapucaieira, ca. 6 km a S da Igreja de Olivença, 14°58′40″S, 39°02′07″W, 50 m, 15 Apr. 2015, Jardim 6782, imm fr (CEPEC, HUEFS, HUVA, MBML, RB, SP, UEC); Mun. Una, Rod. BA-001, Ilhéus–Una, estrada para Pedras de Una, ca. 500 m da BR-001, 15°16′13″S, 39°02′23″W, 40 m, 11 Jan. 2016, Jardim & Delprete 6802, male fl (ALCB, CEPEC, EAC, HUEFS, HURB, JPB, MBM, MBML, RB, SP, UEC, VIES); Mun. Itacaré, Campo Cheiroso, 14°22′50″S, 39°02′23″W, 9 Feb. 2011, Lacerda & Daneu 11, imm fr (CEPEC); Mun. Jequié, Fazenda Brejo Novo, a 10.5 km da Av. Otávio Mangabeira pela Expúrcio Miranda no Bairro do Mandacaru, 13°56′55″S, 40°06′41″W, 559 m, 19 Aug. 2004, Macedo 1243, fl (CEPEC); Mun. Jequié, Fazenda Brejo Novo, a 10.5 km da Av. Otávio Mangabeira pela Expúrcio Miranda no Bairro do Mandacaru, 13°56′55″S, 40°06′41″W, 559 m, 19 Aug. 2004, Macedo 1243, old fl without corolla (CEPEC); Mun. Ilhéus, road from the Fundo das Palmas, 10.5 km da Av. José Rocha, entrada do ramal em frente ao Condomínio Águas de Olivença, situada no km 8 da Rod. Olivença-Una (BA-001), 80 m, 10 May 2000, Mattos Silva et al. 4079, fl (CEPEC); Mun. Ilhéus, Fazenda Barra do Mangueiro, ramal da Estrada no km 10 da Rod. Pontal-Olivença, lado direito, 3 km W da rodovia, 5 Feb. 1982, Mattos Silva et al. 1400, imm fr (CEPEC); Mun. Ituberá, Povoado do Rio do Campo, Faz. Agrícola Litorânea, margem do Rio Canguara, restinga arborea proxima à sede, 10 m, 13 Apr. 1994, Mattos Silva & Rosa 2969, fr (CEPEC); Mun. Ilhéus, road from Olivença to Maruim, 6.1 km W of Olivença, forest on N side of road, 14°59′S, 39°03′W, 1 May 1992, Thomas et al. 9076, fr (CEPEC, NY).

Habitat, ecology and phenology – This species grows in semideciduous seasonal forest and Restinga forest (“Restinga arborea-urbistiva”), commonly on white sand or sometimes on clay-sandy soil, or in transitional vegetation between Restinga forest and wet dense forest (“Floresta Ombrófila densa”), or in disturbed vegetation with selective logging and/or for the extraction of piassava palm (Attalea funifera Mart.); at 10–560 m altitude. Flowering specimens were collected in January, April, November and December. Specimens with immature fruits were collected in January, April, May and December.
February, May, September and November, and with mature fruits in February, April and May.

**Etymology** – The specific epithet refers to the long, thin flower pedicels, which further elongate in the fruiting stage.

**Conservation assessment** – Vunerable (VU), B1 a, b(i, ii, iii). The extent of occurrence (EOO) of this species has been calculated to be 13318 km², which qualifies the species for the Vulnerable (VU) category, and the area of occupancy (AOO) was estimated to be 48 km², which qualifies it for the Endangered (EN) category (Bachman et al. 2011; IUCN 2012, 2017). Although three collections of *Amaioua longipedicellata* were made inside the Mico-Leão Biological Reserve, which is part of the Una Reserve, most collections were made in disturbed vegetation or inside large farms, within the Restinga vegetation domain, along the Atlantic coasts of the state of Bahia, Brazil. The species is known by 19 collections, but only from 10 localities (municipalities). It is extremely rare to find intact Restinga forest, and the few remnants are extremely scattered, as this vegetation is strongly impacted by numerous human activities, as selective logging, agriculture, housing construction, and extraction of piassava palm (*Attalea funifera* Mart.) for the production of fiber. Piassava extraction is commonly believed to be a non-timber forest product that could provide a commercial product with a minimum impact of the surrounding vegetation. However, this extraction is instead often accompanied by the almost complete obliteration of the surrounding vegetation, resulting in large areas where the natural vegetation has almost completely been destroyed and with sparse individuals of this palm on nearly denuded slopes of the Restinga biome. Therefore, due to the scattered areas still present in the region, and the rapid rate of deforestation of the much fragmented Restinga vegetation and semi-deciduous seasonal forests in the state of Bahia, we consider this species as Vulnerable [VU B1 a, b(i, ii, iii)] according to IUCN criteria (IUCN 2012, 2017).

**Notes** – *Amaioua longipedicellata* is also similar to *A. intermedia* Mart. by the subcoriaceous leaf blades, trichotomous male inflorescences, fasciculate female inflorescences (rarely trichotomous in *A. longipedicellata*), pedicellate male and female flowers, and pedicellate fruits; the former differs from the latter by the inflorescences with a thin rachis (vs. stout), male inflorescences commonly 3–9-flowered, each branch ending with a 1–3-flowered cymules (vs. 10–35-flowered, each branch ending with a 3–15-flowered cymule), female inflorescences fasciculate, 2–3-flowered, or rarely trichotomous, 3–9-flowered, each branch ending with a 1–3-flowered cymule (vs. fasciculate, 5–9-flowered), calyx with linear lobes (vs. truncate or undulate), male corollas 11–12.5 mm long, tube 6.5–7 mm long, lobes 4–5.5 mm long (vs. 16–22 mm long, tube 8–10 mm long, lobes 8–12 mm long), female corollas 10.5–13.5 mm long, tube 5.5–7 mm long, lobes 5–7 mm long (vs. 17–23 mm long; tube 8–9 mm long; lobes oblong-lanceolate, 9–14 mm long), fruits oblong-ellipsoidal, 1.2–2.2 × 0.7–1 cm, with pedicels thin, 25–40 mm long (vs. oblong to ellipsoid, 2.5–3.5 × 0.8–1.1 cm, with pedicels stout, (2.5–)3–22 mm long).

A comparison of morphological characters of *Amaioua glomerulata*, *A. intermedia* and *A. longipedicellata* is presented in table 1. Characters and measurements of these three species are based on observations of specimens from throughout their ranges. Selected herbarium specimens of *Amaioua intermedia* and *A. glomerulata* analyzed for this study are reported in appendix 1.

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Appendix 1 – Selected herbarium specimens of *Amaioua intermedia* and *A. glomerulata* analysed for this study.

*Amaioua intermedia*

**Brazil**: Bahia: Uruçuca, estrada de Serra Grande para Uruçuca, mata da torre do celular, 14°29′59″S, 39°06′54″W, 380 m, 18 Mar. 2004, *Fiaschi et al.* 2052, female fl (CEPEC, NY); Camacã, RPPN Serra Bonita, 9.7 km W de Camacã na estrada para Jacarec, ramal para a RPPN, ca. 6 km da entrada, 15°23′30″S, 39°33′55″W, 850 m, 18 Mar. 2005, *Fiaschi et al.* 2859, fr (CEPEC, NY). **Distrito Federal**: Reserva Ecológica do IBGE, Córrego Monjolo, 15°57′S, 47°53′W, 25 Sep. 1989, *Alvarenga & Oliveira* 463, fr (IBGE); Bacia de São Bartolomeu, 24 Jan. 1980, *Heringer et al.* 2870, female fl (IBGE, NY); Parque Municipal do Gama, cachoeira do parque, 10 Mar. 1972, *Heringer* 11218, fr (UB) [2]; Fazenda Água Limpa (UnB Field Station), near Vargem Bonita, 27 Oct. 1976, *Ratter et al.* 3853, fl (NY, UB) [2]. **Goiás**: Mun. Formosa, Lagoa Feia, floresta sempreverde na beira da lagoa (do lado da cidade), 15°34′15″S, 47°18′16″W, 930 m, 27 Dec. 2007, *Delprete & Silva* 10551, fl (CAY, RB, UFG). **Minas Gerais**: Itabirito, Condomínio Aconchego da Serra, 20°15′S, 43°57′W, 1850 m, 11 Sep. 1995, *Silva Neto et al.* 778, fl (CEPEC, K, NY). **Paraná**: Guaraqueçaba, Rio do Cedro, 14 Dec. 1967, *Hatschbach* 18130, female fl (MBM, MO). **Rio de Janeiro**: Itaiapia, Parque Nacional do Itatiaia, Maromba, trilha para a Cachoeira Itaporani, 22°28′00″S, 44°34′44″W, 1050 m, 11 Sep. 1995, *Silva Neto et al.* 778, imm fr (CEPEC, K, NY). **Santa Catarina**: Presidente Nereu, Sábiá, 600 m, 26 Dec. 1953, *Reitz & Klein* 1412, fl (HBR, NY, US); Ibirama, Horto Florestal I.N.P., 300 m, 2 Mar. 1954, *Reitz & Klein* 1664, fr (HBR, NY, US).

*Amaioua glomerulata*

**Mexico**: Chiapas: Mun. Las Margaritas, W side of Laguna Miramar E side of San Quintin, 16°23′39″N, 91°17′48″W, 350 m, 11 Feb. 1973, *Breedlove* 33144, fr (MO, NY). **Belize**: Belize District, Belize Zoo, savanna plot immediately behind zoo, mile 31 on Western Highway, 15 m, 18 Jun. 1993, *Walker & Meadows* 157, fl (NY); along Manatee (or Coastal) Highway, 5.1 miles SE of turnoff from Western Hwy, at La Democracia, 1 Jun. 1996, *Nee* 46894, fl (MO, NY). **Honduras**: Atlântida: Campoampebebrada Grande, ca. 10 km SW of La Ceiba, base of N slope of Pico Bonito, from camp to 2 km E of camp, 15°42′N, 86°51′W, 80–180 m, 10 May 1993, *Liesner* 26181, fr (MO). **Nicaragua**: Comarca de El Cabo, Rio Leicis, 28 km SW of Waspun, 66 m, 25 Aug. 1965, *Molina* 15200, female fl (NY). **Guatemala**: Izabal, Sto. Tomás de Castilla, ca. 30 km SW of town, Sinai, 15°39′N, 88°35′W, 15 Mar. 1988, *Marshall et al.* 396, fl (MO, NY). **Panama**: Panama: Las Perlas, San José Island, 19 Jul. 1967, *Stimson* 5328, male fl (NY). **Cuba**: Isle of Pine, San Pedro and vicinity, 12 Feb. – 22 Mar. 1916, *Britton & Wilson* 14300, fl (MO, NY). **Trinidad and Tobago**: Aripo Road, 17 Dec. 1926, *Broadway* 6443, fl (MO).
Colombia: Chocó: Riosucio, Parque Nacional Los Catios, near Tilupo, 250–260 m, 30 May 1976, Forero et al. 1698, fr (MO).

Venezuela: Zulia: Ditrito Colón, forested slopes at the settlement of Río de Oro along Río de Oro, along Venezuelan-Colombian Border, 9°18′N, 72°29′W, 30–150 m, 26 Jun. 1980, Davidse et al. 18634, male fr (MO, VEN).

Guyana: Kanuku Mountains, Rupunini River, Crabwood Creek, 29 Jun. 1995, Jansen-Jacobs et al. 4278, fr (CAY, GB, NY); Rupununi District, Kuyuwini Landing, Kuyuwini River, 10 Oct. 1992, Jansen-Jacobs et al. 2832, imm fr (CAY, MO, NY, U).

Suriname: Mapane Creek, area near camp 8, 21 Jan. 1956, Schulz 7548 (NY, U).

French Guiana: Sinnamary, Brigandin, 26 Mar. 1993, Puig 12055, imm fr (CAY); basse Crique Courouaïe (affluent du basse Approuague), a 5 km amont des Deux Fourches, 15 Jan. 1970, Oldeman B-2766, imm fr (CAY).

Brazil: Amazonas: Manaus, Estrada Taruma, near Ponta Negra, 10 Jan. 1967, Prance 3922, fr (MO, NY).

Peru: San Martín: Mariscal Caceres, Distrito Tocache Nuevo, Puente Palo Blanco (Rio Tocache), 10 km W of Tocache Nuevo, on road to Puerto Pizana, 08°14′S, 76°35′W, 550–650 m, 12 Dec. 1981, Plowman et al. 11342, fl (MO).