A New Species of Guadua, *G. calderoniana* (Poaceae: Bambuseae), with Notes on the Genus in Bahia, Brazil

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*Guadua* Kunth (Poaceae: Bambusoideae: Bambuseae) is a genus of ca. 25–30 species occurring in forests and savannas from Mexico and northern South America to Paraguay and Argentina, with a center of diversity in western Amazonia and the Orinoco basin (McClure, 1973; Young, 1985; Soderstrom & Londono, 1987, 1988). Until now, no South America to Paraguay and Argentina, with a (based only on Bahian material) enabled us to identify three species of *Guadua* from the state: *G. paniculata* Munro, *G. tagoara* (Nees) Kunth, and a new taxon herein described and illustrated. We provide a key to all Bahian representatives of the genus, along with descriptions (terminology follows that of Soderstrom & Londono, 1988) and lists of specimens examined.

Key to the species of *Guadua* from Bahia, Brazil (based only on Bahian material)

1a. Culms robust, 6–10(–15) cm diam.; culm leaf blades broadly triangular, at most as long as the sheaths; foliage leaf blades 21–30 × 3–7 cm

1b. Culms more slender, 2–6 cm diam.; culm leaf blades narrowly triangular, usually longer than the sheath; foliage leaf blades 14–27 × 0.7–3.7 cm

2a. Foliage leaf blades 15–27 × 2–3.7 cm, ovate- to oblong-lanceolate; sheaths with prominent auricles 5–10 mm long, bearing prominent setae 15–25 mm long; wings of the palea keels glabrous, smooth, ca. 1 mm wide; culm leaf blades persistent

2b. Foliage leaf blades 14–18 × 0.7–1 cm, linear-lanceolate; sheaths rarely auriculate (auricles if present less than 5 mm long), bearing setae only 8–10 mm long; wings of the palea keels silky-pubescent, ciliolate, less than 0.4 mm wide; culm leaf blades caducous


Figure 1. *Guadua calderoniana* Londoño & Judziewicz. —A. Synflorescence terminating leafy branch. —B. Bud at midculm node. —C. Branch at midculm node showing thorns. —D, E. Young branches at midculm node, front and lateral views. —F. Pseudospikelet. (All drawings based on Calderón et al. 2386.)
convex, continuous with the blade and confluent with the inner ligule, bearing setose auricles; auricles 7–9 mm long, falcate-lanceolate, dark brown, bearing long setae, at length deciduous; setae ca. 15 mm long, numerous, arising from the margin and adaxial surface of the auricle, ivory-colored, lustrous, curled distally; inner ligule 1.3–3 mm long, membranous, truncate, indurate, stramineous, with ciliolate margins; outer ligule absent; blade 20–35 × 5–8 cm, equal to or longer than the sheath, or occasionally slightly smaller, persistent, lanceolate-triangular, erect, slightly concave at the base, attenuate-apiculate at the apex, tessellate on both surfaces, abaxially with hard, brown, appressed hairs, these usually denser at the base, adaxially conspicuously nerved with fine, light-brown hairs in narrow, vertical bands, separated by glabrous nerves, the margins smooth. Branching intravaginal, solitary and armed, the lowermost nodes developing stout hooked thorns 6–7 cm long, the middle and upper nodes producing a single branch held at a 30° angle, in age developing 2–3 supplemental branches from the basal proximal nodes. Foliage leaves borne in lax complements of 12–15 leaves; sheath green when young, later stramineous, pubescent on the back, ciliate on the margins, auriculate at the summit, covered with two types of hairs, one type less than 0.05 mm long and densely covering the surface, the other type up to 1 mm long, rigid, hyaline, and perpendicular to the surface; auricles 5–10 mm long, falcate-lanceolate, dark brown, glabrous, bearing elongate setae; setae 15–25 mm long, arising from the margin of the auricle, slightly curled distally, tawny; inner ligule ca. 1 mm long, rimlike, dark brown, ciliolate on the margins; outer ligule rimlike, ca. 0.7 mm long, dark brown, puberulent throughout; pseudopetiole 5–10 mm long, covered on both surfaces with short, rigid, patent hairs less than 0.5 mm long; blades 15–27 × 2–3.7 cm, ovate- to oblong-lanceolate, truncate to rounded at the base above the pseudopetiole, the apex acuminate, symmetrical, glabrous on both surfaces, the midnerve and secondary nerves more prominent on the lower surface, 14–18-nerved, the margins strigose. Synflorescence terminating leafy or leafless branches, iterantact, polytelic, consisting of 4–5 colflorescences with 5–15 multiflowered pseudospikelets in each one. Pseudospikelets 4–8 × 1 cm, stout, straight, green when young, later stramineous, comprised of a subtending bract, a prophyll, 2–4 basal gemmiparous bracts, 1(–2) empty bracts, 1 sterile lemma, 4–10 fertile florets, and terminating in a rudimentary floret; rachilla green, pubescent, always elongated a little beyond the uppermost gemmiparous bract; subtending bracts varying in size and shape throughout the main axis, pubescent, sometimes bearing setae at the summit of the sheath; prophyll pubescent, winged, and ciliolate on the keels, asymmetrical, enclosing a floral bud; basal gemmiparous bracts commonly 2–4 (mostly 3), approximate, positioned close to the prophyll, 3–7 × 3–5 mm, broadly ovate to ovate-lanceolate, the apex apiculate with a mucro ca. 1 mm long, pubescent abaxially, shiny and lustrous adaxially, the margins ciliate; empty bracts 1(–2), 12–15 × 5–7 mm, caducous; sterile lemma 15–18 × 5–7 mm, acuminate at the apex, with a mucro ca. 1 mm long, 23–27-nerved, short-pubescent abaxially, shiny adaxially, the margins ciliate, always enclosing a rudimentary palea. Florets stramineous; lemma 17–27 × 7–10 mm, ovate-lanceolate, the acute apex with a stiff mucro ca. 1 mm long, 23–27-nerved, abaxially stramineous or green with yellow spots and covered with rigid, hyaline, appressed, patent hairs up to 1 mm long, these denser at the base near the junction with the rachilla, adaxially glabrous and glossy, the margins ciliate, completely embracing the palea; palea ca. 15 × 7 mm (spread width), somewhat shorter than the lemma, stramineous, glossy, glabrous, with transverse veins between the keels, 9–11-nerved, slightly bifid at the apex, the keels bearing smooth, glossy, hyaline wings ca. 1 mm wide. Lodicles 3, membranous, hyaline, many-nerved, glabrous except for bicellular microhairs on the margin near the apex; anterior pair 4–5 × 2–3 mm, spatulate, their apices obliquely acute; posterior lodicule somewhat shorter but just as wide as the anterior pair, truncate to obtuse at apex. Androecium with 6 stamens; filaments filiform, free; anthers 7–10 × 0.5–1 mm, sagittate at the base, with a hair at the apex of each theca, purple. Gynoeicum with ovary 3–8 × 1 mm, fusiform, glabrous at the base, densely antrorse-hispidulous in the middle and upper portions; style hispidulous; stigmas 3, plumose, purple. Fruit a fusiform carpopsis 9 × 2 mm (the single example apparently immature).


Guadua calderoniana appears to be the unnamed native bamboo alluded to by Renvoize (1984: 17, as Bambusa Schreb.) in his treatment of the grasses of Bahia. It is known only from two collections made in wet forests at elevations of 100–200 m in Bahia, Brazil, south of the cities of Itabuna and Ilhéus. Guadua calderoniana differs from all other congeners in the following distinctive combi-
nation of characters: stout, nearly solid culms (Fig. 1B); usually elongate culm leaf blades (Fig. 2A); prominent foliage leaf sheath auricles bearing elongate setae (Fig. 2D); elongate, straight, stout pseu-

DOSPIKELETS (Fig. 1F); and short-pubescent lemmas (Fig. 2H). The prominent foliage leaf sheath auricles bearing numerous, elongate setae are particularly distinctive. The affinities of the new species are uncertain.

The specific epithet honors Cleofe E. Calderón, prolific collector of many new tropical American bamboos.

Like many species of the narrow zone of wet forest in coastal Bahia, G. calderoniana is endangered by widespread forest cutting (Mori et al., 1983; Soderstrom & Londono, 1987, 1988), and, more recently, burning of the small remnants that are left, whether or not they are protected in reserves (Burman, 1989).


Woody and thorny bamboo; culms 5–12 m × 2–6 cm, erect below, arching above, the internodes 25–28 cm long, hollow with walls 3 mm thick, glabrous. CALM LEAVES deciduous, finely pubescent throughout; sheaths 10–20 × 7–18 cm with auricles absent or rarely present and up to 2 mm long; inner ligule 1–2 mm long; outer ligule absent; blades 14–22 × 6–9 cm, triangular, caducous. FOLIAGE LEAVES with sheaths usually glabrous; auricles if present up to 5 mm long, bearing setae 8–10 mm long; pseudopetiole 2–3 mm long, short-hirsute; blades 14–18 × 0.7–1 cm, linear-lanceolate, pubescent on both surfaces. SYNFloRESCENCE with axes pubescent. Pseudospikelets 2–3 cm × 2–4 mm, slightly arcuate, 4–6-flowered; lemma 5–7 × 3.5 mm, silky-pubescent on both surfaces; palea 6.8 × 2.4 mm, exceeding the lemma, silky-pubescent, the keels ciliolate with inconspicuous wings less than 0.4 mm wide.

Distribution: Guadua paniculata is found in a variety of wet to seasonally dry habitats below 1,000 m from Mexico and northern South America to Bolivia, Paraguay, and southern Brazil (Santa Catarina). It is a somewhat polymorphic species that has not yet been well studied.

Specimen examined. BRAZIL. BAHIA: Mun. Andarai, Serra do Sincora, 9 km S of Andarai on road to Itaeté, elev. 360 m, 12 May 1976, Calderón, Santos & Oliveira 2433 (CEPEC, US).


Woody and thorny bamboo; culms 20–30 m × 6–10(–15) cm, erect, arching above, the internodes hollow, scabrous. Calm leaves deciduous, covered with fine appressed brown hairs; sheaths 17–38 × 20–30 cm, lacking auricles and setae; inner ligule 2–4 mm long; outer ligule absent; blades 3.7 × 9–13 cm, very broadly triangular, erect, persistent. Foliage leaves with sheaths ciliate on the margins and often with a line of hairs on one side of the midnervc, otherwise glabrous; auricles absent or rarely present and up to 5 mm long, bearing setae 8–10 mm long at the summit; pseudopetiole ca. 10 mm long, glabrous; blades 21–30 × 3–7 cm, broadly ovate-lanceolate, glabrous. Synflorescence with axes glabrous. Pseudospikelets 1.3 cm × 3–6 mm, straight, 4–6-flowered; lemma 6.8 × 5–7 mm, papilllose abaxially, silky-pubescent adaxially, ciliate on the margins; palea 7.9 × 3–5 mm, exceeding the lemma, puberulous, the keels with puberulent, ciliolate wings ca. 1 mm wide.

Distribution: Wet forest edges below 1,000 m in eastern Brazil (Bahia to Santa Catarina).


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