

irregularly pinnate, not plicate, bases of blades running diagonally into the rachis; sheaths 17.7(11.0–30.0) cm long; petioles 18.0(6.5–30.0) cm long, drying green or yellowish; rachis 56.2(39.5–80.0) cm long, 4.2(2.6–7.2) mm in diameter; veins raised and rectangular in cross-section adaxially; pinnae 2(1–10) per side of rachis; basal pinna 55.4(42.0–76.0) cm long, 17.2(6.7–33.0) cm wide, forming an angle of 20(12–28)° with the rachis; apical pinna 28.8(14.0–39.5) cm long, 19.5(12.5–40.0) cm wide, forming an angle of 25(20–35)° with the rachis. *Inflorescences* branched 1–2 orders; prophylls and peduncular bracts not ribbed with elongate, unbranched fibers, flattened, persistent; prophylls 24.2(12.7–33.0) cm long, not short and asymmetrically apiculate, the surfaces ridged with close, equal, parallel, non-dividing ridges, scarcely tomentose between the ridges, without unequally wide ridges; peduncular bracts 23.6(13.5–31.0) cm long, well-developed, inserted 2.8(1.2–7.0) cm above the prophyll; peduncles 29.1(13.3–44.2) cm long, 4.0(2.1–8.4) mm in diameter; rachillae 6(3–11), 16.7(4.0–31.0) cm long, 3.2(2.2–4.3) mm in diameter, the surfaces without spiky, fibrous projections or ridges, drying brown, with faint to pronounced, short, transverse ridges, not filiform and not narrowed between the flower pits; flower pits spirally arranged, glabrous internally; proximal lips without a central notch before anthesis, not recurved after anthesis, not hood-shaped; proximal and distal lips drying the same color as the rachillae, not joined to form a raised cupule, the proximal lip margins overlapping the distal lip margins; distal lips well-developed; staminate and pistillate petals not emergent, not valvate throughout; staminate flowers deciduous after anthesis; stamens 6; thecae diverging at anthesis, inserted almost directly onto the filament apices, the connectives bifid but scarcely developed; anthers short and curled over at anthesis; non-fertilized pistillate flowers persistent after anthesis; staminodial tubes crenulate at the apex, those of non-fertilized flowers projecting and persistent after anthesis; *fruits* 10.6(8.2–12.8) mm long, 7.8(6.1–9.6) mm in diameter, the bases with a prominent, asymmetric stipe, the apices not conical, the surfaces not splitting at maturity, with fibers emerging to give spiny fruits, not bumpy, not apiculate; locular epidermis with operculum, smooth, with pores.

Distribution and habitat:—From 6°50'N–7°47'S and 45°30'–66°45'W in the central and northeastern Amazon region of Brazil, the Guianas, and Venezuela at 192(7–725) m elevation in lowland rainforest (Fig. 9). Galeano and Bernal (2010) report this species from extreme eastern Colombia in Amazonas and Guainía.

Taxonomic notes:—*Geonoma baculifera* is closely related to *G. congesta* and *G. calyptrognoidea*. These three species all have the staminodial tubes of non-fertilized pistillate flowers projecting and persistent after anthesis. *Geonoma baculifera* differs from its two relatives in its rachillae surfaces with faint to pronounced, short, transverse ridges, and fruit surfaces without fibers emerging.

Subspecific variation:—Two traits (stem branching, leaf division) vary within this species. There is no evidence of geographic discontinuity, although there are a few outlying specimens from the central Amazon region.

3. *Geonoma bernalii* Henderson, *sp. nov.* (Appendix IV, Plate 1)

A speciebibus affinis prophyllis haud brevibus necnon inaequaliter apiculatis, atque fructibus haud apiculatis crusta haud tuberculata differt.

Type: COLOMBIA. Antioquia: Mun. San Luis, 105 km al este de Medellín en la carretera a Bogotá, vereda Riosol, 1200 m, 9 October 1987, R. Bernal 1399 (holotype COL!, isotype NY!).

Plants 1.3 m tall; stems 1.5 m tall, 0.5 cm in diameter, solitary or clustered, cane-like; internodes 1.7(1.0–2.3) cm long, yellowish and smooth. *Leaves* 8 per stem, undivided or irregularly pinnate, not plicate, bases of blades running diagonally into the rachis; sheaths 6.3(6.0–6.5) cm long; petioles 5.8(2.0–9.5) cm long, drying green or yellowish; rachis 13.3(12.5–14.1) cm long, 1.6(1.3–1.9) mm in diameter; veins not raised or slightly raised and triangular in cross-section adaxially; pinnae 3 per side of rachis; basal pinna 9.8(9.0–10.5) cm long, 1.4(1.2–1.6) cm wide, forming an angle of 41(37–44)° with the rachis; apical pinna 7.0(6.0–8.0) cm long, 5.2(4.2–6.2) cm wide, forming an angle of 36(33–38)° with the rachis. *Inflorescences* branched 1 order;

prophylls and peduncular bracts not ribbed with elongate, unbranched fibers, flattened, persistent; prophylls 5.3(4.8–5.7) cm long, not short and asymmetrically apiculate, the surfaces not ridged, without unequally wide ridges; peduncular bracts 4.5 cm long, well-developed, inserted 0.6 cm above the prophyll; peduncles 6.6(6.4–6.7) cm long, 1.5(1.4–1.6) mm in diameter; rachillae 4(3–4), 4.3(4.1–4.4) cm long, 1.3(1.1–1.5) mm in diameter, the surfaces without spiky, fibrous projections or ridges, drying brown with faint to pronounced, short, transverse ridges, filiform with extended narrowed sections between the flower pits; flower pits alternately arranged (sometimes distorted by twisting and contracting of rachillae), glabrous internally; proximal lips without a central notch before anthesis, not recurved after anthesis, not hood-shaped; proximal and distal lips drying the same color as the rachillae, joined to form a raised cupule, the margins not overlapping; distal lips well-developed; staminate and pistillate petals not emergent, not valvate throughout; staminate flowers deciduous after anthesis; stamens 6; thecae diverging at anthesis, inserted almost directly onto the filament apices, the connectives bifid but scarcely developed; anthers short and curled over at anthesis; non-fertilized pistillate flowers deciduous after anthesis; staminodial tubes crenulate or shallowly lobed at the apex, those of non-fertilized flowers not projecting and persistent after anthesis; *fruits* 6.0 mm long, 6.2 mm in diameter, the bases without a prominent, asymmetric stipe, the apices not conical, the surfaces not splitting at maturity, without fibers emerging, not bumpy and not apiculate; locular epidermis without operculum, smooth, without pores.

Distribution and habitat:—From 6°05'–6°07'N and 75°00'–75°02'W on the eastern slopes of the Central Cordillera in Colombia (Antioquia) at 1105(1010–1200) m elevation in montane rainforest (Fig. 9).

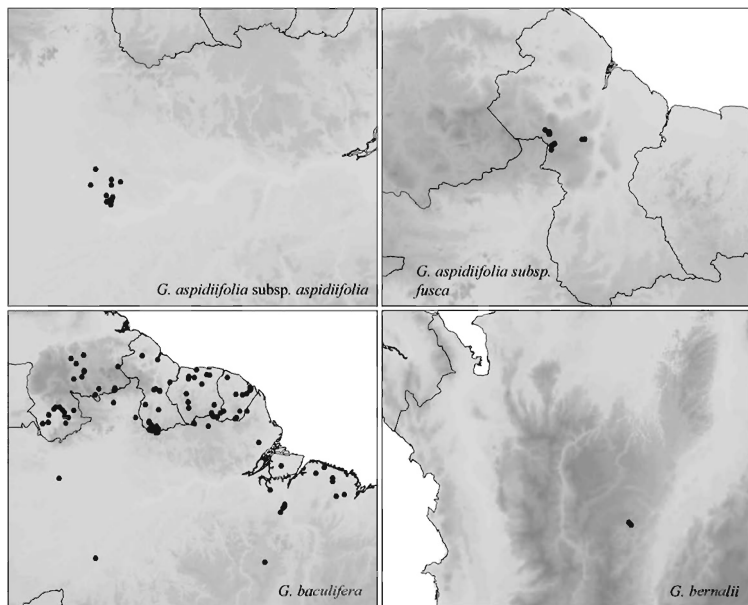


FIGURE 9. Distribution maps of *Geonoma aspidiifolia* subsp. *aspidiifolia*, *G. aspidiifolia* subsp. *fusca*, *G. baculifera*, and *G. bernalii*.

Taxonomic notes:—The two specimens examined have been previously determined as *Geonoma leptospadix*. They bear a superficial resemblance to that species but differ in their alternately arranged flower pits, not hood-shaped proximal lips, and cupular proximal and distal lips. *Geonoma bernalii* is similar to several species in the *G. lanata* clade. It differs from these in its prophylls not short and asymmetrically apiculate, and fruit surfaces not bumpy and not apiculate.

Subspecific variation:—The only trait to vary between the two specimens examined is stem branching. On both specimens pinnate leaves were measured, but one specimen also has undivided leaves present.

4. *Geonoma braunii* (Stauffer) Henderson, *comb. & stat. nov.*

Basionym: *Geonoma spinescens* var. *braunii* Stauffer (1997: 5). Type: VENEZUELA. Yaracuy: Mun. Nirgua, ca. 5 km N of Nirgua, Cerro La Chapa, 10°12'N, 68°33'W, 1200–1300 m, 28 November–1 December 1996, A. Fernández, F. Stauffer, R. Riina, K. Walter-Weissbeck & O. Kunert 10087 (holotype VEN n.v.).

Plants 2.0(1.5–2.5) m tall; stems 2.0(1.5–2.5) m tall, 1.0(0.8–1.2) cm in diameter, solitary or clustered, not cane-like or cane-like; internodes 1.0(0.3–2.1) cm long, yellowish and smooth. *Leaves* 12(10–13) per stem, undivided or irregularly pinnate, not plicate, bases of blades running diagonally into the rachis; sheaths 6.5 cm long; petioles 13.9(8.0–22.0) cm long, drying green or yellowish; rachis 22.9(18.3–32.0) cm long, 2.1(1.4–2.8) mm in diameter; veins not raised or slightly raised and triangular in cross-section adaxially; pinnae 2(1–4) per side of rachis; basal pinna 24.9(17.5–33.0) cm long, 4.7(3.0–10.5) cm wide, forming an angle of 35(21–53)° with the rachis; apical pinna 15.9(13.5–21.8) cm long, 10.3(6.5–17.8) cm wide, forming an angle of 24(18–28)° with the rachis. *Inflorescences* branched 2–3 orders; prophylls and peduncular bracts not ribbed with elongate, unbranched fibers, flattened, deciduous; prophylls 5.3(4.5–6.1) cm long, short and asymmetrically apiculate, the margins curved around the stem, the surfaces flat with dense, felty, brown tomentum, prophyll equal to and early deciduous with the peduncular bract, the surfaces not ridged, without unequally wide ridges; peduncular bracts 5.8 cm long, well-developed, inserted 0.2(0.1–0.4) cm above the prophyll; peduncles 10.6(6.0–14.5) cm long, 3.4(2.2–5.3) mm in diameter; rachillae 24(22–26), 7.0(6.0–8.5) cm long, 0.8(0.7–1.0) mm in diameter, the surfaces without spiky, fibrous projections or ridges, drying brown, with faint to pronounced, short, transverse ridges, filiform with extended narrowed sections between the flower pits; flower pits alternately arranged (sometimes distorted by twisting and contracting of rachillae), glabrous internally; proximal lips without a central notch before anthesis, not recurved after anthesis, not hood-shaped; proximal and distal lips drying the same color as the rachillae, joined to form a raised cupule, the margins not overlapping; distal lips well-developed; staminate and pistillate petals not emergent, not valvate throughout; staminate flowers deciduous after anthesis; stamens 6; thecae diverging at anthesis, inserted almost directly onto the filament apices, the connectives bifid but scarcely developed; anthers short and curled over at anthesis; non-fertilized pistillate flowers deciduous after anthesis; staminodial tubes crenulate or shallowly lobed at the apex, those of non-fertilized flowers not projecting and persistent after anthesis; *fruits* 7.4(6.5–8.1) mm long, 6.0(5.1–6.9) mm in diameter, the bases without a prominent stipe, the apices not conical, the surfaces not splitting at maturity, without fibers emerging, bumpy from the numerous, subepidermal, tangential, short fibers present, these coming to a point at fruit apices; locular epidermis without operculum, smooth, without pores.

Distribution and habitat:—From 10°09'–10°15'N and 68°28'–68°37'W in the Coastal Cordillera in Venezuela (Yaracuy), at 1192(1045–1300) m elevation in montane rainforest (Fig. 10).

Taxonomic notes:—Stauffer (1997) recognized this species as a variety of *Geonoma spinescens*. It is here recognized at the species level, differing from *G. spinescens* in its alternately arranged flower pits.

Subspecific variation:—Three traits (stem branching, stem type, leaf division) vary within this species, but all specimens come from the same area.