

apices; anthers not short and curled at anthesis, usually elongate, spiraled and twisted or sometimes remaining straight; non-fertilized pistillate flowers deciduous after anthesis; staminodial tubes lobed at the apex, the lobes spreading at anthesis, acuminate, those of non-fertilized flowers not projecting and persistent after anthesis; *fruits* 12.3 mm long, 9.2 mm in diameter, the bases without a prominent stipe, the apices not conical, the surfaces not splitting at maturity, without fibers emerging, not bumpy, not apiculate; locular epidermis with operculum, smooth, with pores.

**Distribution and habitat:**—From 7°18'–5°33'N and 74°18'–75°36'W in the Central Cordillera in Colombia (Antioquia), with an outlier in the Eastern Cordillera, at 890(550–1450) m elevation in lowland to montane rainforest (Fig. 11).

**Taxonomic notes:**—*Geonoma chlanydostachys* differs from similar species in the *G. macrostachys* clade (*G. camana*, *G. chococola*, *G. deneversii*, and *G. maxima*) in its 6 stamens; thecae diverging at anthesis and inserted directly onto the apiculate filament apices; and fruit surfaces not splitting.

**Subspecific variation:**—No traits vary within this species, nor is there any geographic discontinuity.

**10. *Geonoma chococola*** Wessels Boer (1968: 103). Type: COLOMBIA. Valle del Cauca: Buenaventura, 6 May 1926, *O. Cook 84* (holotype US!).

*Plants* 2.8(1.5–4.0) m tall; stems 1.9(1.0–3.0) m tall, 3.5 cm in diameter, solitary or clustered, cane-like; internodes 3.7 cm long, yellowish and smooth. *Leaves* 11(7–21) per stem, undivided or irregularly pinnate, not plicate, bases of blades running diagonally into the rachis; sheaths 16.5(8.0–23.0) cm long; petioles 37.9(15.3–61.0) cm long, drying green or yellowish; rachis 111.7(80.0–137.0) cm long, 7.6(4.6–12.5) mm in diameter; veins raised and rectangular in cross-section adaxially; pinnae 3(1–7) per side of rachis; basal pinna 48.5(30.0–80.0) cm long, 13.2(4.5–43.5) cm wide, forming an angle of 27(16–38)° with the rachis; apical pinna 30.1(21.7–40.5) cm long, 26.5(20.5–35.0) cm wide, forming an angle of 28(20–40)° with the rachis. *Inflorescences* unbranched or branched 1 order; prophylls and peduncular bracts ribbed with elongate, unbranched fibers, both bracts tubular, narrow, elongate, closely sheathing the peduncle, more or less persistent; prophylls 35.0(23.7–49.5) cm long, not short and asymmetrically apiculate, the surfaces not ridged, without unequally wide ridges; peduncular bracts 60.8(38.5–83.0) cm long, well-developed, inserted 2.2(1.5–3.0) cm above prophyll; peduncles 86.3(46.0–143.0) cm long, 6.4(3.9–8.6) mm in diameter; rachillae 1(1–4), 27.8(16.5–47.0) cm long, 10.1(5.8–15.2) mm in diameter, the surfaces without spiky, fibrous projections or ridges, drying brown or yellow-brown, without short, transverse ridges, not filiform and not narrowed between the flower pits; flower pits spirally arranged, glabrous internally; proximal lips with a central notch before anthesis, often the two sides of the notch overlapping, 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 persistent after anthesis; stamens 6; thecae diverging at anthesis, inserted directly onto the apiculate filament apices; anthers not short and curled at anthesis, usually elongate, spiraled and twisted or sometimes remaining straight; non-fertilized pistillate flowers deciduous after anthesis; staminodial tubes lobed at the apex, the lobes spreading at anthesis, acuminate, those of non-fertilized flowers not projecting and persistent after anthesis; *fruits* 18.9(14.8–24.9) mm long, 15.7(11.3–17.8) mm in diameter, the bases without a prominent stipe, the apices not conical, the surfaces splitting deeply and longitudinally at maturity to reveal mesocarp with dense layer of radial fibers, with fibers emerging, not bumpy, not apiculate; locular epidermis with operculum, smooth, with pores.

**Taxonomic notes:**—*Geonoma chococola* was said by Henderson *et al.* (1995) to have 12 stamens, but this appears to be a mistake. All eight specimens examined with staminate flowers have 6 stamens. In the following treatment, *G. awaensis* is recognized as a subspecies of *G. chococola*; it is not recognized at the species level because it shares the same character state combinations as *G. chococola*.

**Subspecific variation:**—Three traits vary within this species (stem branching, leaf division, inflorescence branching). There is geographic discontinuity and specimens occur in two separate areas. Based on one trait distribution (inflorescence branching) and geography, two subgroups can be recognized and these are treated as subspecies (subsp. *chococola*, *awaensis*). There are too many missing data for most variables for analysis, but subsp. *chococola* has significantly longer and wider rachillae (*t*-test,  $P < 0.05$ ).

#### Key to the subspecies of *G. chococola*

- 1 Inflorescences unbranched..... subsp. *chococola*  
- Inflorescences branched with 2–4 rachillae..... subsp. *awaensis*

#### 10a. *Geonoma chococola* subsp. *chococola*

*Inflorescences* unbranched; rachillae 31.1(20.0–47.0) cm long, 11.2(8.1–15.2) mm in diameter.

**Distribution and habitat:**—From 3°02'–5°45'N and 76°15'–77°32'W on the Pacific coast in western Colombia, and one outlying specimen in the Cauca Valley, at 109(0–500) m elevation in lowland rainforest (Fig. 11).

#### 10b. *Geonoma chococola* subsp. *awaensis* (Henderson, Borchsenius & Balslev) Henderson, *comb. & stat. nov.*

**Basionym:** *Geonoma awaensis* Henderson, Borchsenius & Balslev (2008: 60). Type: ECUADOR. Esmeraldas: Awá Reserve, footpath to Río Mira, 1°15'N, 78°40'W, 216 m, 20 September 1993, H. Beck, A. Ortiz, H. Cantincuz & A. Cantincuz 2176 (holotype NY!, isotype QCNE *n.v.*).

*Inflorescences* branched; rachillae 18.6(16.5–20.5) cm long, 6.5(5.8–7.1) mm in diameter.

**Distribution and habitat:**—From 0°48'–1°15'N and 78°26'–78°44'W on western Andean slopes in northwestern Ecuador at 275(200–500) m elevation in lowland rainforest (Fig. 11).

11. *Geonoma concinna* Burret (1930a: 229). Type: COLOMBIA. Antioquia: Tabor, 1950 m, 27 January 1880, W. Kalbreyer 1367 (holotype B, destroyed). Neotype (selected by Bernal *et al.* 1989): COLOMBIA. Antioquia: carretera Granada-San Luis, 5.5 km adelante de El Chocó, 1750 m, 20–21 September 1987, R. Bernal & L. Tobón 1358 (neotype COL!, isoneotype NY!).

*Plants* 1.8(1.5–2.5) m tall; stems 3.5 m tall, 1.0(0.9–1.2) cm in diameter, clustered, cane-like; internodes 3.5(2.5–4.5) cm long, yellowish and smooth. *Leaves* 8 per stem, undivided or irregularly pinnate, not plicate, bases of blades running diagonally into the rachis; sheaths 14.0 cm long; petioles 9.0 cm long, drying green or yellowish; rachis 27.4(20.3–38.5) cm long, 3.4(3.1–3.8) mm in diameter; veins raised and rectangular in cross-section adaxially; pinnae 2(1–4) per side of rachis; basal pinna 30.5(24.0–37.0) cm long, 8.2(8.0–8.4) cm wide, forming an angle of 44(35–55)° with the rachis; apical pinna 17.9(14.0–20.8) cm long, 10.0(8.0–12.0) cm wide, forming an angle of 38(32–42)° with the rachis. *Inflorescences* branched 2 orders; prophylls and peduncular bracts not ribbed with elongate, unbranched fibers, flattened, deciduous; prophylls 10.8(9.0–12.5) 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 7.2 cm long, well-developed, inserted 0.4(0.2–0.6) cm above the prophyll; peduncles 11.1(8.2–13.2) cm long, 3.6(3.0–4.2) mm in diameter; rachillae 19(13–21), 1.7(8.0–14.8) cm long, 1.7(1.2–2.7) 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, hood-shaped at anthesis, sometimes splitting post-anthesis; proximal and distal lips drying the same color as the rachillae, not