

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 deciduous after anthesis; staminodial tubes crenulate or shallowly lobed at the apex, those of non-fertilized pistillate flowers not projecting and persistent after anthesis; *fruits* 9.6(7.3–12.1) mm long, 7.4(5.6–8.5) mm in diameter, the bases with a prominent, asymmetric stipe, the apices conical with rounded apices, the surfaces not splitting at maturity, without fibers emerging, not bumpy, not apiculate; locular epidermis without operculum, sculpted, usually also with a raised, meridional ridge; locular epidermis without pores.

Distribution and habitat:—From 8°24'–17°04'S and 35°04'–41°23'W in the Atlantic Coastal Forest of Brazil from Pernambuco to Bahia, with an inland outlier in Bahia, at 291(20–770) m elevation in lowland rainforest (Fig. 30).

Taxonomic notes:—The type locality is unknown. The label of the type specimen (“in sylvis ad fluv. Amazonum”) differs from the description (“in...Provinciarum Piauhienensis et Maraguaniensis”). *Geonoma pauciflora* is a member of a group of species from the Atlantic Coastal Forest and adjacent Cerrado of Brazil (the *G. schottiana* clade, also including *G. elegans*, *G. pohliana*, and *G. schottiana*). Although the group is well-supported, all constituent species are extremely variable internally. *Geonoma pauciflora* differs from *G. elegans* in its flattened prophylls and peduncular bracts which are not ribbed with elongate, unbranched fibers; from *G. pohliana* in its prophyll surfaces not ridged and without unequally wide ridges; and from *G. schottiana* in its undivided or irregularly pinnate leaves.

Subspecific variation:—Three traits vary within this species (stem branching, leaf division, inflorescence branching). There is little geographic discontinuity, and the specimens are widely distributed in the northern part of the Atlantic Coastal Forest of Brazil. Leaving aside stem branching and leaf division, the remaining trait—inflorescence branching—does not divide the specimens into consistent groups. However, *Geonoma pauciflora* is variable in leaf division and inflorescence branching, and three morphotypes may be recognized.

The first morphotype has pinnate (rarely undivided) leaves and branched (rarely unbranched) inflorescences (*pinnate-branched* morphotype). This morphotype occurs in two separate areas; Pernambuco and Alagoas, and central and southern Bahia. The gap between these two areas is likely to be based on unsuitable habitat (W. Thomas, pers. comm.). However, there are too few specimens from Pernambuco and Alagoas to test for differences between the areas. Specimens of this morphotype from the most southerly part of the range in Bahia (e.g., *Gentry 49920*, *Thomas 12020*) tend to have smaller leaves and inflorescences, and may be hybrids between *Geonoma pauciflora* and *G. elegans* (which see).

The second morphotype has undivided leaves and branched inflorescences, and occurs in central Bahia with an outlier further inland (*undivided-branched* morphotype). The type of *Geonoma conduruensis* is of this morphotype.

The third morphotype has undivided leaves and unbranched (rarely branched) inflorescences, and occurs in two localities in central Bahia (*undivided-unbranched* morphotype).

48. *Geonoma peruviana* Henderson, *sp. nov.* (Appendix IV, Plate 53)

A speciebus affinibus internodis squamis brenneis crebre tectis differt.

Type: PERU. Huánuco: Prov. Leoncio Prado, Distrito Hermilio Valdizan, cerca La Divisoria, 1500–1600 m, 25 June 1976, J. Schunke 9416 (holotype MO!).

Plants 1.0(0.9–1.2) m tall; stems height no data, 1.0(0.8–1.2) cm in diameter, branching no data, not cane-like or cane-like; internodes 0.4(0.3–0.5) cm long, covered with dense, brown scales. *Leaves* irregularly pinnate,

not plicate, bases of blades running diagonally into the rachis; sheaths no data; petioles drying green or yellowish; rachis no data; veins not raised or slightly raised and triangular in cross-section adaxially; pinnae 3 per side of rachis; basal pinna length, width, and angle no data; apical pinna 12.5 cm long, 15.0 cm wide, forming an angle of 40° with the rachis. *Inflorescences* branched 2 orders; prophylls and peduncular bracts not ribbed with elongate, unbranched fibers, flattened (if tubular, narrow, and elongate then not ribbed), deciduous or persistent; prophylls 8.5 cm long, not short and asymmetrically apiculate, the surfaces not ridged, without unequally wide ridges; peduncular bracts length no data, well-developed, no data on insertion; peduncles 17.0 cm long, 2.3 mm in diameter; rachillae 10(9–10), 7.4(6.5–8.2) cm long, 1.2(1.1–1.3) 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, hood-shaped at anthesis, sometimes splitting post-anthesis; 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 deciduous after anthesis; staminodial tubes crenulate or shallowly lobed at the apex, those of non-fertilized pistillate flowers not projecting and persistent after anthesis; *fruits* 5.4 mm long, 5.2 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:—At 9°00'S and 75°55'W in Peru (Huánuco) on eastern Andean slopes at 1550 m elevation in montane rainforest (Fig. 30).

Taxonomic notes:—Only two specimens of this species are known. It differs from related species in its internodes covered with dense, brown scales.

Subspecific variation:—No trait varies within this species, nor is there any geographic disjunction.

49. *Geonoma pinnatifrons* Willdenow (1805: 593). Type: VENEZUELA. "Caracas, Buenavista", no date, F. Bredemeyer 20 (holotype *B. n.v.*, holotype image!, isotype M!).

Plants 3.3(1.0–8.0) m tall; stems 2.6(0.1–6.0) m tall, 2.1(1.2–3.2) cm in diameter, solitary or clustered, not cane-like or cane-like; internodes 1.1(0.3–2.5) cm long, yellowish and smooth. *Leaves* 12(6–23) per stem, irregularly pinnate, not plicate, bases of blades running diagonally into the rachis; sheaths 32.5(13.0–63.0) cm long; petioles 54.9(10.0–125.0) cm long, drying green or yellowish; rachis 89.1(36.0–163.0) cm long, 6.6(1.9–14.5) mm in diameter; veins raised and rectangular in cross-section adaxially; pinnae 9(2–39) per side of rachis; basal pinna 42.3(21.5–65.0) cm long, 4.7(0.5–22.5) cm wide, forming an angle of 47(20–70)° with the rachis; apical pinna 33.6(16.0–61.0) cm long, 17.3(3.5–44.5) cm wide, forming an angle of 29(21–37)° with the rachis. *Inflorescences* branched 1–4 orders; prophylls and peduncular bracts not ribbed with elongate, unbranched fibers, flattened (if tubular, narrow, and elongate then not ribbed), deciduous or persistent; prophylls 15.6(7.0–25.0) cm long, not short and asymmetrically apiculate, the surfaces ridged and densely tomentose with widely to closely spaced ridges, unequally wide, often dividing from and rejoining other ridges, the prophyll margins with irregular, spine-like projections, the prophylls usually splitting irregularly between the ridges; peduncular bracts 16.8(10.0–27.5) cm long, well-developed, inserted 2.6(0.6–7.4) cm above the prophyll; peduncles 24.2(10.0–42.0) cm long, 8.1(2.4–21.2) mm in diameter; rachillae 18(4–45), 14.2(7.0–28.3) cm long, 2.3(1.1–3.8) 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, densely hairy internally proximally and distally; proximal lips without a central notch before anthesis, not recurved after anthesis, hood-shaped at anthesis,

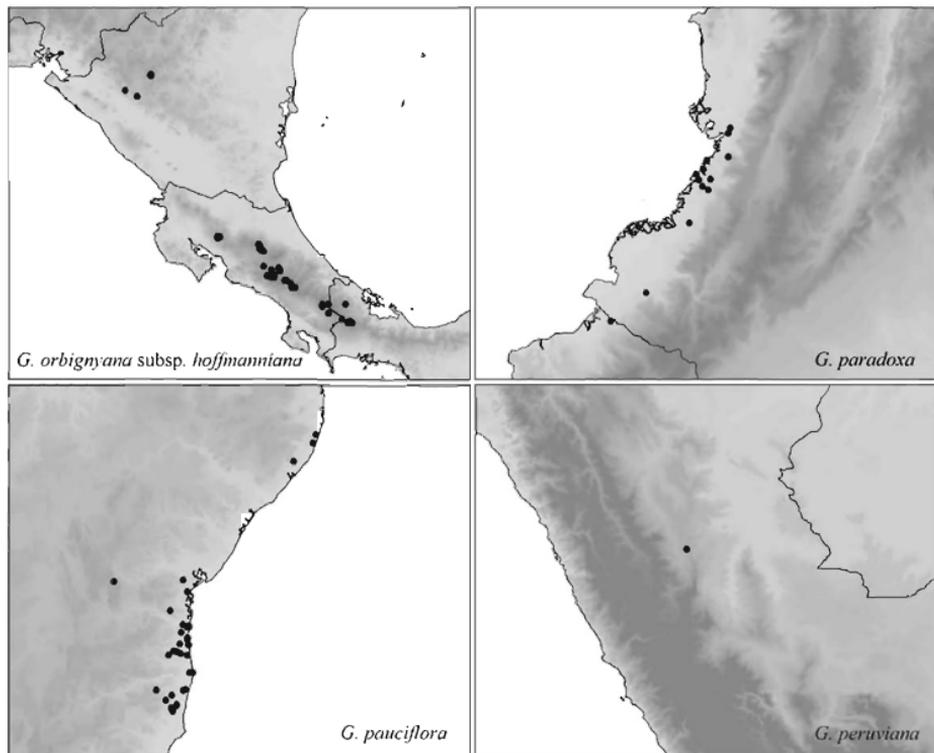


FIGURE 30. Distribution maps of *Geonoma orbignyana* subsp. *hoffmanniana*, *G. paradoxa*, *G. pauciflora*, and *G. peruviana*.

Plants 1.9(1.0–3.0) m tall; stems 2.3(1.5–3.0) m tall, 0.7(0.5–1.2) cm in diameter, solitary or clustered, cane-like; internodes 2.0(0.9–2.9) cm long, yellowish and smooth. *Leaves* 12(7–19) per stem, undivided or irregularly pinnate, not plicate, bases of blades running diagonally into the rachis; sheaths 8.4(3.7–15.5) cm long; petioles 12.8(4.5–27.0) cm long, drying green or yellowish; rachis 24.2(13.0–44.0) cm long, 2.5(1.2–4.5) mm in diameter; veins not raised or slightly raised and triangular in cross-section adaxially; pinnae 2(1–6) per side of rachis; basal pinna 17.5(10.5–26.0) cm long, 3.0(1.4–6.0) cm wide, forming an angle of 36(14–66)° with the rachis; apical pinna 11.8(7.0–18.5) cm long, 8.3(5.0–18.0) cm wide, forming an angle of 30(17–45)° with the rachis. *Inflorescences* unbranched or branched 1 order; prophylls and peduncular bracts not ribbed with elongate, unbranched fibers, flattened (if tubular, narrow, and elongate then not ribbed), deciduous or persistent; prophylls 13.5(7.0–19.0) cm long, not short and asymmetrically apiculate, the surfaces not ridged, without unequally wide ridges; peduncular bracts 12.4(5.4–18.5) cm long, well-developed, inserted 3.1(1.6–5.1) cm above the prophyll; peduncles 20.8(10.5–33.5) cm long, 2.7(1.2–5.0) mm in diameter; rachillae 3(1–6), 10.7(4.7–18.2) cm long, 2.9(1.6–4.3) 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 usually spirally arranged, sometimes decussately or tricusately, then the groups not closely spaced nor consistently arranged throughout the 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, not joined to form a raised cupule, the proximal lip