

*Principes*, 42(1), 1998, pp. 94–103

## Notes on *Geonoma* in Mesoamerica

GREG DE NEVERS

*California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118*

MICHAEL H. GRAYUM

*Missouri Botanical Garden, Box 299, St. Louis, MO 63166*

### ABSTRACT

*Geonoma hugonis* Grayum & de Nevers and *G. monospatha* de Nevers are described as new species. *Geonoma hugonis*, known only from western Panama, is a member of subg. *Geonoma*, but cannot be assigned to either of its two sections as currently circumscribed. *Geonoma monospatha*, known from western Panama and eastern Costa Rica, belongs to sect. *Geonoma* of subg. *Geonoma*, and is compared with *G. stricta* (Poi.) Kunth. New observations are presented relevant to *Geonoma calyptrogynoides* Burret, *G. congesta* H. Wendl. ex Spruce, *G. divisa* H. E. Moore, *G. edulis* H. Wendl. ex Spruce, *G. epetiolata* H. E. Moore, *G. ferruginea* H. Wendl. ex Spruce, and *G. jussieuana* Mart.

Continuing study of herbarium material for floristic and monographic projects involving Central American palms (cf. de Nevers and Grayum 1995) has uncovered two new Mesoamerican species of *Geonoma*. New information has also become available on seven other *Geonoma* species occurring, or alleged to occur, in Panama.

### Descriptions of New Species

***Geonoma hugonis*** Grayum & de Nevers **sp. nov.** (Figs. 1–2).

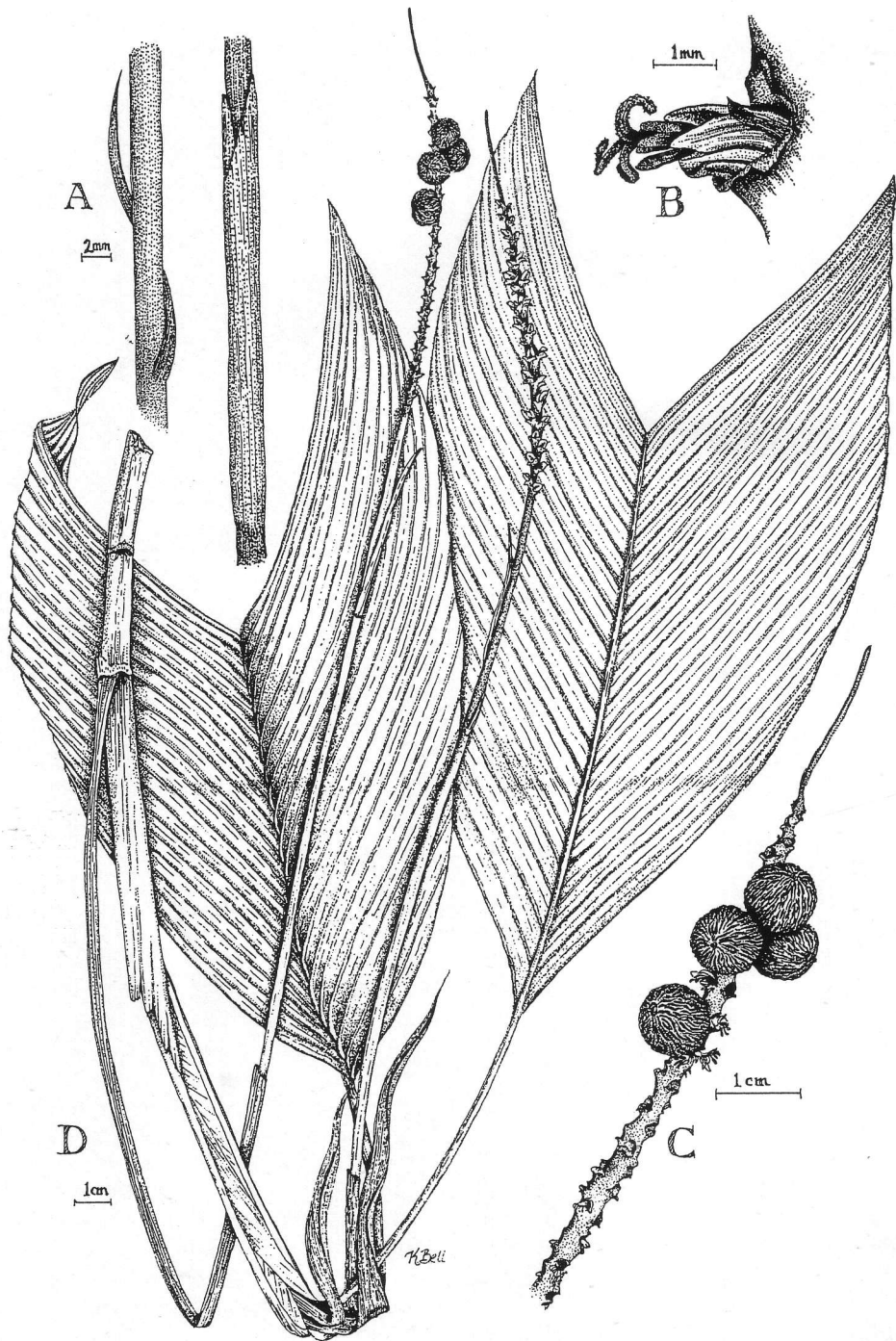
Species combinatione inflorescentiae spicatae cum bractea pedunculi supra orem prophylli inserta et tubo staminodiali florum pistillatarum digitate lobato a congeneribus diversa. Typus: Panama, Chiriquí, Fortuna Dam area, between Quebrada Los Chorros and Quebrada Hondo [sic], to N of reservoir, in forest N of road, 8°45'N, 82°14'W, 1,100 m, 20 Sep. 1984, *Churchill & Churchill 6185* (holotypus MO-4324593! MO-4326527!; isotypus CAS!).

Stems 0.5–1 (–1.5) m × 4–7 (–10) mm, solitary or subcespitose, erect or decumbent at the base and then rooting at the nodes (“prop roots” of label data), producing small offshoots at the lower nodes; leaves 5–8; sheath ca. 4–8 cm, at

first tubular and enclosing stem, later splitting opposite the petiole; petiole beyond sheath 3.5–13 (–18) cm, shallowly channelled adaxially, rounded abaxially; rachis 5.5–20 cm; blade 9.5–30 (–36) × 6–13 (–19) cm, simple, bifid 1/3 to 1/2 its length, narrowly obovate to obdeltate, drying a deep chocolate-brown, with 17–26 primary lateral veins per side, these prominently raised adaxially, less so abaxially, subglabrous to densely appressed-scurfy abaxially and often setulose, diverging from midrib at ca. 24–42°; inflorescences 1–3 per stem, interfoliar, spicate; peduncle 15.5–53 cm × 2–4 mm, flattened, glabrous to densely brownish scurfy; prophyll and peduncular bract tubular, papyraceous; prophyll 7–15.5+ cm × 2–4 mm; peduncular bract 4–7 (–17.5) cm × 2–3 mm, or (often) reduced to a scale or obsolete, attached 12.8–29 cm above the insertion of the prophyll (usually well beyond its mouth); rachis 4.5–13 cm × 1.5–3.5 mm, subglabrous to sparsely or densely puberulent, red in fruit, the distal 5–15 mm usually sterile and narrower than the fertile portion; floral pits spirally arranged, bilabiate, ca. 1–2 mm apart, the lower lip usually bifid, the upper lip entire, the orifice ca. 1–2 × 1–2 mm, glabrous but coarsely tessellate within; sepals of staminate flowers 1.5–2 mm, obovate, bluntly keeled abaxially, ciliolate, weakly striate-nerved; petals 2.5–3.5 × 1.5 mm, narrowed to the base, connate below, free distally, imbricate at the tips, the lobes abaxially convex with ca. 10 prominent nerves; staminal tube funnelliform, ca. 1.2–2 mm, stamens 6, filaments ca. 1.0 × 0.2 mm, flattened, anthers ca. 0.7–0.9 mm, inflexed at anthesis, spirally coiled after dehiscence; sepals of pistillate flowers 2.0–2.5 mm, narrowly obovate, imbricate, keeled abaxially, ciliolate; petals 2.8–3.2 × 0.9–1.2 mm, connate below, free and valvate in distal 1/3, the lobes subacute,



2. *Geonoma hugonis*. Habit. Hodel et al. 1242. Photo by Don Hodel.



1. *Geonoma hugonis*. (A) Variation in peduncular bract. (B) Flower, showing digitate staminodial tube. (C) Fruits. (D) Habit. Drawn from Croat 48653 & 67809.

striate with ca. 7–9 nerves; staminodial tube ca. 2.0 mm, cylindrical, digitately lobed, the lobes 0.5–0.7 mm, subequal, barely exerted from corolla; styles 3, ca. 1 mm, reflexed; fruits 4.5–6 mm diameter, subglobose to slightly oblate, apiculate, black when ripe, finely striate when dry; germination unknown.

*Distribution and phenology.* *Geonoma hugonis* is known only from the Continental Divide area of western Panama in Bocas del Toro and Chiriquí Provinces. It occurs in the Premontane Rain Forest and Lower Montane Rain Forest life zones between 1000 and 1,450 m elevation. Flowering specimens have been collected during most months of the year.

*Paratypes.* PANAMA. Bocas del Toro: headwaters of Río Culebra, ca. 5 km ENE of Cerro Pate Macho, 4,400 ft., *Hammel 6134* (MO); Chiriquí border along Continental Divide on Carretera del Oleoducto ca. 1 km N of Quebrada Arena, IRHE Fortuna Hydroelectric Project, 8°46'N, 82°12'W, 1,150 m, *Knapp 5078* (MO). Chiriquí: between Gualaca and the Fortuna Dam site, at 5.9 mi NW of Los Planes de Hornito, 1,370 m, *Antonio 4092* (MO); Fortuna Dam area, Quebrada Bonito to N of reservoir, 8°45'N, 82°13'W, 1,100 m, *Churchill 5752* (MO), *5800* (MO); rd. to the Fortuna Dam Site, N of Gualaca, 11.8 mi N of Los Planes de Hornito, 1,400 m, *Croat 48653* (MO, PMA); between Gualaca and Fortuna Dam site, 8.3 mi NW of Los Planes de Hornito, 82°16'W, 8°44'N, 1,260 m, *Croat 49946* (MO); Gualaca-Chiriquí Grande Rd. over Fortuna Lake, along gravel rd. which departs main hwy. near Continental Divide, 8°44'N, 81°17'W, 1,170 m, *Croat 66671* (MO); between Gualaca and Chiriquí Grande, 1 km S of Continental Divide, 8°45'N, 82°18'W, 1,075 m, *Croat 66850* (CAS, MO); Gualaca-Chiriquí Grande, 7.2 mi beyond Los Planes de Hornito, 8°44'N, 82°14'W, 1,165–1,200 m, *Croat 67809* (MO, US); Fortuna Dam Area, Fortuna-Chiriquí Grande, 5.3 mi N of center of Fortuna Dam, then 1.4 mi along gravel rd., 8°44'N, 82°17'W, *Croat & Zhu 76331* (MO); Fortuna dam area, rd. from Gualaca to Chiriquí Grande, continental divide trail W of rd., 8°45'N, 82°15'W, 1,150 m, *de Nevers & McPherson 6856* (MO); La Fortuna hydroelectric project, along trail uphill behind camp, 1,200–1,400 m, *Hammel 2116* (MO); 15 km N of Hornito on road to La Fortuna, 4,500 ft., *Hammel 6225* (MO); west from Fortuna Dam Camp to La Fortuna, 8°43'N, 82°14'W, 1,300 m,

*Hampshire & Whitefoord 892* (BM); 1 km N of Fortuna Lake, 8°43'N, 82°14'W, 1,200 m, *Hampshire & Whitefoord 922* (BM); trail behind Fortuna Dam Camp up ridge, 1,300–1,600 m, *Hodel et al. 1242* (MO); 10 km N of Los Planes de Hornito, IRHE Fortuna Hydroelectric Project, 1,150 m, *Knapp & Vodicka 5618* (MO); between Fortuna Dam and the continental divide, ca. 8°45'N, 82°15'W, 1,150 m, *McPherson 7300* (MO); Fortuna Dam region, above N edge of lake, ca. 8°45'N, 82°15'W, 1,100 m, *McPherson 9071* (MO); Cerro Colorado, 35.6 km from Río San Félix bridge, 1,390 m, *Sullivan 365* (MO); Cerro Colorado, wet forest on windswept ridge, 8°40'N, 81°45'W, 1,450 m, *de Nevers et al. 8924* (CAS).

The specific epithet of *Geonoma hugonis* commemorates the late Hugh W. ("Hugo") Churchill (1946–1993), former curator of the Summit Herbarium (SCZ) and friend and colleague of both authors. Though primarily a pteridologist specializing on tree ferns, Hugo prepared many ample and well-annotated palm specimens from the Fortuna region (where he collected extensively) and other sites throughout Panama.

Specimens of *Geonoma hugonis* have routinely been determined as *G. cuneata* H. Wendl. ex Spruce (including *G. gracilis* H. Wendl. ex Spruce), a sympatric species which also has simple leaf blades and spicate inflorescences. Nonetheless, *G. hugonis* is sharply distinguished from *G. cuneata* (and all other *Geonoma* species with the aforementioned characteristics) by the very wide separation of its prophyll and peduncular bract (with the latter inserted beyond the mouth of the former), in conjunction with the digitately lobed staminodial tubes of its pistillate flowers.

On the basis of having six (rather than three) stamens, *G. hugonis* is unequivocally referable to subg. *Geonoma* in the classification of Wessels Boer (1968); however, it cannot be so easily accommodated in either of the two sections of that subgenus, and seems to blur the distinction between them. All species in sect. *Taenianthera* (Burret) Wess. Boer have spicate inflorescences and digitately lobed staminodial tubes, but also have the prophyll and peduncular bract inserted "closely together at the base of the peduncle" (Wessels Boer 1968: 96; the phrase "closely together" is nowhere quantified). The larger sect. *Geonoma* is variable with regard to inflorescence branching and bract insertion, but digitately

lobed staminodial tubes occur only "in species with branched inflorescences" (Wessels Boer 1968: 104). Our perusal of *Geonoma* descriptions published since Wessels Boer's revision has turned up no additional species that flagrantly defy his sectional circumscriptions after the manner of *G. hugonis*.

The French Guianan *Geonoma oldemanii* Granv., assigned to sect. *Taenianthera* by its author (de Granville 1975), is perhaps the best overall phenetic match for *G. hugonis*. The two species share simple leaf blades, spicate inflorescences, and digitately lobed staminodial tubes, and both exhibit a separation between the prophyll and peduncular bract. However, this separation is not nearly so great in *G. oldemanii* (2–6 cm) as in *G. hugonis* (12.8–29 cm), and the peduncular bract of the former species is not even exerted from the prophyll, let alone inserted above its mouth. *Geonoma oldemanii* also has proportionately narrower and much longer (115–130 cm) leaf blades than *G. hugonis*.

*Geonoma schottiana* Mart. (sect. *Geonoma*), of southeastern Brazil, may be the only *Geonoma* species with tubular inflorescence bracts, other than *G. hugonis*, to have the peduncular bract inserted beyond the mouth of the prophyll. It does not otherwise resemble *G. hugonis*, however; the inflorescence is branched to two orders, the flower pits are decussate, and the staminodial tube is shortly dentate.

The relative lengths and position of insertion of the major inflorescence bracts (prophyll and peduncular bract) are important diagnostic characters in *Geonoma* (Wessels Boer 1968:26–28). There seem to be two basic patterns, correlated with developmental changes in ontogeny. In one, the bracts are short and fat (relative to the overall size of the plant), and are inserted close together at the base of the peduncle. The peduncular bract is enclosed in the prophyll, the bracts split at the sutures to reveal the developing inflorescence and are early deciduous (during or shortly after anthesis), and the rachillae are coiled in bud. In the other pattern the bracts are tubular, persistent even in fruit, and split distally for only a short distance to allow the inflorescence to emerge by elongation. In the latter group there is variation as to the position of insertion of the peduncular bract, from proximal on the peduncle (within 1–3 cm of the prophyll) in the majority of species, to distal on the peduncle but within the prophyll (as in *G. jussieuana*, *G.*

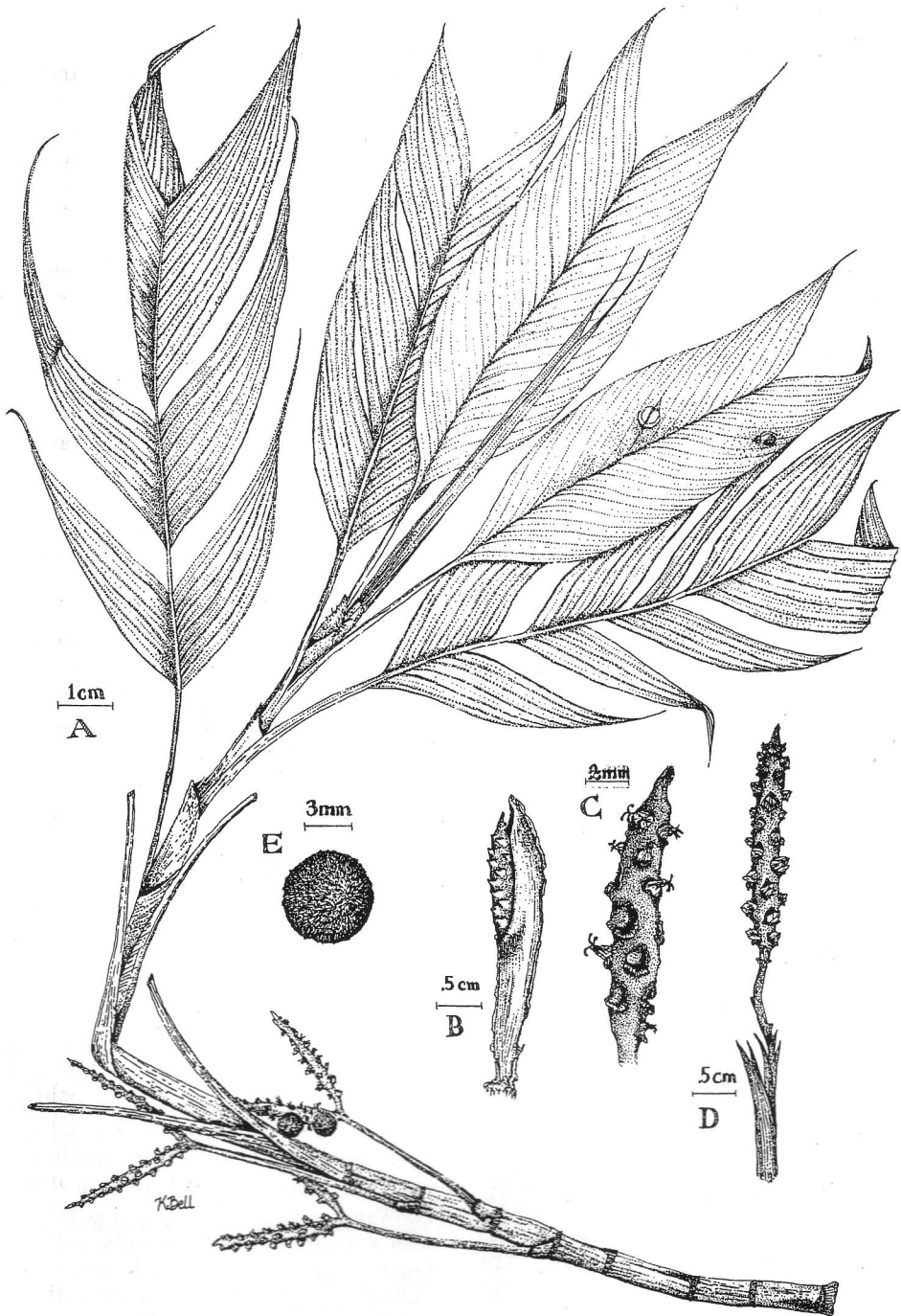
*hoffmanniana* H. Wendl. ex Spruce, and *G. lehmannii* Dammer ex Burret), to beyond the mouth of the prophyll (*G. hugonis* and *G. schottiana*). *Geonoma stricta* (Poit.) Kunth and *G. monospatha* (described below), which have only one inflorescence bract, may exemplify a third developmental pattern. In these species the bract splits lengthwise to reveal the inflorescence and is deciduous shortly after anthesis (as in the first pattern).

The only somewhat aberrant specimen among the paratypes of *Geonoma hugonis* is *Hammel 6134* (MO), which accounts for the parenthetical maxima for leaf-blade length and width in the species description. This is also the only collection from Cerro Pate Macho and, apparently, one of just two collections from the Atlantic slope (Prov. Bocas del Toro). It is in no other way unusual.

***Geonoma monospatha* de Nevers sp. nov.**  
(Fig. 3).

*Geonoma stricta* aemulans, differt pedunculo rachillis longiore inflorescentiaque glabra vel stellato-pubescenti. Typus: PANAMA. Veraguas: Cerro Tute, just west of Santa Fe, 8°40'N, 81°05'W, 800–1,000 m, 27 Feb. 1995, de Nevers, Henderson, Galeano & Bernal 10556 (holotypus PMA!; isotypi CAS, COL, K, MO, NY).

Stems 1–2.5 m × 6–9 mm, cespitose, erect, smooth and cane-like; leaves 5–9, cleanly deciduous; sheath 2–4 cm, at first tubular and encircling stem, at maturity encircling the stem only basally, split opposite the petiole distally; petiole beyond sheath 6–12 cm, flattened adaxially, rounded abaxially, densely appressed-scurfy, glabrescent; rachis 15–18 cm; blade 19–24 × 5–5.5 cm, simple and bifid (1/6 to 1/4 its length), or trijugate, or irregularly divided (the leaves of taller stems tending to be simple basally grading into divided apically), parallel-sided, cuneate at base, subglabrous to densely appressed-scurfy abaxially and often setulose, drying a light chocolate-brown, with 17–32 primary lateral veins per side, these not conspicuously raised, or conspicuous abaxially, diverging from the midrib at ca. 25°–35°; inflorescences 1–4, interfoliar or infrafoliar at anthesis, infrafoliar in fruit, with two rachillae or (less commonly) spicate or with three rachillae; peduncle 4.3–7 cm × 2–4 mm, flattened, glabrous to densely brownish scurfy; prophyll 4.5–6 cm ×



3. *Geonoma monospatha*. (A) Habit. (B) Inflorescence bud. (C) Rachilla at pistillate anthesis. (D) Inflorescence just prior to staminate anthesis. (E) Fruit. Drawn from Knapp & Kress 4342, Croat 48961, Hammel 4616, de Nevers 10556.

4–6 mm, thin, tubular, early deciduous; enlarged peduncular bract absent, the peduncle with 2–5 scalelike bracts; rachis obsolete; rachillae 2–4 cm  $\times$  2–4 mm, subglabrous to sparsely or densely puberulent, red in fruit, the distal 1–4 mm, sterile and narrower than the fertile portion; floral pits spirally arranged, bilabiate, ca. 2–3 mm apart, the lower lip usually bifid, the upper lip entire, inconspicuous, the orifice ca. 1–2  $\times$  1–2 mm, glabrous and smooth within; sepals of staminate flowers 1.5–2 mm, obovate, bluntly keeled abaxially, margins entire, nerves obscure; petals 2.5–3.5  $\times$  1–1.5 mm, narrowed to the base, connate below, free distally, imbricate at the tips, the lobes abaxially convex with ca. 10 prominent nerves; staminal tube funnellform, ca. 1.2–2 mm, stamens 6, filaments ca. 1.0  $\times$  0.2 mm, flattened, anthers ca. 0.7–0.9 mm, inflexed at anthesis, spirally coiled after dehiscence; sepals of pistillate flowers 2.0–2.5 mm, narrowly obovate, imbricate, keeled abaxially, ciliolate; petals 2.8–3.2  $\times$  0.9–1.2 mm, connate below, free and valvate in distal 1/3, the lobes subacute, striate with ca. 7–9 nerves; staminodial tube ca. 2.0 mm, cylindrical, crenulate (often irregularly so), barely exerted from corolla; styles 3, ca. 1 mm, reflexed; fruits 4.8–5.26 mm diameter, globose, blunt apically, black, finely verrucose when dry; germination unknown.

*Distribution and phenology.* *Geonoma monospatha* is known from Premontane Wet Forest (Holdridge 1971) on the Atlantic slope and Continental Divide area of western Panama and eastern Costa Rica between 350 and 1,500 m elevation. Flowering specimens are known from March and September through November; fruiting specimens are known only from November. This species probably blooms irregularly throughout the year.

*Paratypes.* PANAMA. Bocas del Toro: hills just S of Chiriquí Grande, at end of pipeline access road 10 mi. N of Continental Divide, 350–500 m, Hammel *et al.* 14732 (CAS). Veraguas: Cerro Tute, just west of Santa Fe, 8°32'N, 81°07'W, 800–1,400 m, Knapp & Kress 4342 (MO); 1,250–1,350 m, Croat 48961 (MO); 800–1,000 m, Dressler 5182 (MO, PMA, US); Folsom *et al.* 3339 (MO); 3,200–5,600 ft., Hammel 4616 (MO). COSTA RICA. San Jose: Cantón de Turrubares, Z.P. Cerros de Turrubares, Cerros de Puriscal, faldas del Cerro Pelón, 1 km Oeste de San Rafael, 09°40'50"N, 84°28'W, 1500 m, Zúñiga & Varela 942 (CAS, MO, CR).

The species epithet of *Geonoma monospatha* refers to its lack of an enlarged peduncular bract, a rare condition in *Geonoma* shared only with *G. stricta* (sensu Henderson *et al.* 1995). *Geonoma monospatha* phenetically resembles *G. stricta*, an Amazonian species, with which it also shares narrowly cuneate leaves and a crenate staminodial tube. Dressler 5182 was determined as *G. stricta* without query by H. E. Moore. The inflorescence of *G. stricta* is usually spicate, with a very short peduncle and much longer spike. This is the reverse of the situation in *G. monospatha*, which has a long peduncle and short inflorescence, usually with two or three rachillae. The rachis of *G. stricta* is usually densely pubescent, with the flower pits barely emerging through the tomentum, while the rachillae of *G. monospatha* are subglabrous. Furthermore, *G. stricta* has densely crowded, vertically superposed flower pits and oblong, apically pointed fruits, whereas *G. monospatha* has spirally arranged pits and globose, apically rounded fruits.

Another Amazonian species similar phenetically to *G. monospatha* is *G. aspidiifolia* Spruce, which has similarly proportioned and branched inflorescences. *Geonoma aspidiifolia* differs in having enlarged peduncular bracts and digitately lobed staminodial tubes.

A species likely to be encountered in Panama with or near *G. monospatha* is *G. epetiolata* H. E. Moore. These two species have somewhat similar inflorescences; however, those of *G. epetiolata* are almost always spicate, with the rachis much longer than the peduncle, and are larger in all their dimensions (peduncle 6.5–9 cm, rachis 19–22 cm). The leaves of *G. epetiolata* are very different from those of *G. monospatha*, being digitately triangular, and purplish red.

In Wessels Boer's (1968) monograph of the geomoid palms, specimens of *G. monospatha* with spicate inflorescences cannot be keyed. Specimens with two or three rachillae key, with moderate leaps of imagination, to *G. ferruginea* H. Wendl. ex Spruce. This is a larger species with a woody prophyll, an enlarged peduncular bract, much longer and more numerous rachillae, and inflorescences usually branched to two orders.

### Notes on Additional Species

#### *Geonoma calyptrogynoidea* Burret

Henderson *et al.* (1995) placed *Geonoma calyptrogynoidea* Burret in synonymy under *G.*

*congesta* H. Wendl. ex Spruce without comment. Judging from the specimens cited below, *G. calyptrogynoides* is quite distinct from *G. congesta* and is, in fact, not even in the same group within the genus (Wessels Boer 1968). The inflorescence of *Geonoma congesta* is usually branched to two orders and has a short (6.5–8 cm) peduncle with a distinct rachis, and numerous (ca. 11) short rachillae (15–17 cm). Its inflorescence bracts are short, oval, and coriaceous, its peduncular bract is shorter than the prophyll, and both bracts are deciduous at the time of anthesis. The inflorescence of *Geonoma calyptrogynoides*, on the other hand, is nearly digitate, being branched to only one order, and has a long peduncle (40–55 cm), a short or obsolete rachis (to 5 cm), and fewer (4–7) longer (23–25 cm) rachillae than *G. congesta*. The inflorescence bracts of *G. calyptrogynoides* are thin, tubular, and persistent on fruiting specimens, and the peduncular bract exceeds the prophyll.

*Geonoma congesta* and *G. calyptrogynoides* are allopatric, with the latter species ranging from Prov. Darién, Panama, into Depto. Chocó, Colombia, at elevations below 500 m. *Geonoma congesta* is common on the Atlantic slope of Nicaragua, Costa Rica and Panama from sea level to about 800 m, and has one Pacific slope occurrence on the Osa Peninsula of Costa Rica. It seems odd that *G. congesta* ranges east in Panama to Colón Province (Santa Rita Ridge), yet apparently does not reach San Blas, although there is no obvious biogeographic break there. *Astrocaryum alatum* Loomis has a similar ecogeographical range with the same eastern terminus. D'Arcy (1987a: 26) listed *G. calyptrogynoides* as occurring in western Panama (Prov. Bocas del Toro, Veraguas), but the sole voucher cited (D'Arcy 1987b: 269) is a misidentified specimen of *G. congesta*. In Panama, *G. calyptrogynoides* occupies drier forest types than *G. congesta*.

***Geonoma calyptrogynoides*** Burret, Bot. Jahrb. 63:223. 1930.

*Type.* Colombia, La Mesa, *Kalbreyer 1398* (Holotype B, destroyed). COLOMBIA. Chocó: Zona de Uraba, Cerro del Cuchillo, sector Cuchillo Blanco, Bmh-t, 10–20 m, 15 octubre 1987, *D. Cárdenas 668* (Neotype MO, here designated; isoneotypes: CAS, JAUM [n.v.]).

*Additional specimens examined.* PANAMA. Darién: Quebrada Bidoto (Peccary Creek), off

Río Areti, “doquidia” (Chocó, “cortadero” (Sp.), used for thatch, *Duke 13598* (MO); Serranía del Sapo, Río Chado, 7°30'N, 78°10'W, *Hahn 293* (MO); 1 mi. E of Manene, *Hartman 12113* (MO); Parque Nacional del Darién, ridge between Río Topalisa and R. Pucuro, ca. 9 km E of Pucuro, Quebrada Pobre, 8°02'N, 77°24'W, 450 m, *de Nevers 8305* (CAS, MO); 13 km E of Pucuro, 450–600 m, *de Nevers et al. 8319* (CAS); Cuasi-Cana trail, between Tres Bocas and Cerro Campamiento, *Kirkbride & Duke 1349* (MO); Río Jaque valley, ridges, 7°26'N, 78°05'W, 300–500 m, *Knapp & Mallet 3103* (MO); Mamey, *Whiteford & Eddy 417* (MO). COLOMBIA. Chocó: Mpio. Turbo, Carretera Tapón del Darién, Sector Río León-Lomas Aisladas km 16, “suelo pantanoso,” 20 m, *Brand & González 520* (MO); Mpio. Riosucio, Zona de Urabá, Cerro Cuchillo, 520 m, *Cárdenas 469* (MO); *Cárdenas 771* (MO); Alto de Río Jurbidó, cerca de las bocas de la quebrada Mundaquera, 06°05'N, 77°10'W, 0–100 m, *Barbosa 6480* (MO); Bahía Solano, near Ciudad Mutis, Quebrada Jella, 0–75 m, *Killip & García 33623* (US); La Concepción, 15 km E of Quibdó, 75 m, *Archer 1980* (US). Santander: Puerto Berrío, between Río Carare & Río Magdalena, 100–700 m *Haug't 1850* (US). Valle: Bajo Calima, Concesión Pulpapel/Buenaventura, 03°55'N, 77°00'W, 100 m, *Monsalve 350* (MO).

***Geonoma divisa*** H. E. Moore

Henderson et al. (1995: 256) attributed *Geonoma divisa* H. E. Moore to Panama, presumably on the basis of *de Nevers 6392* (NY), annotated as *G. divisa* by G. Galeano in 1992. This specimen actually represents a depauperate, high-elevation form of *G. longevaginata* H. Wendl. ex Spruce. In addition, Henderson et al. (1995: 226) changed the concept of *G. divisa* from that intended by Moore (with flower pits in whorls of three) to one with spirally arranged flower pits (as in *de Nevers 6392*). Examination of the MO isotype of *G. divisa* suggests that it may represent no more than a variety or form of *G. diversata* (Poit.) Kunth with unusually shaped leaves. Moore (1980) distinguished *G. divisa* from *G. diversata* on the basis of its leaf shape and “very prominently elevated, narrow ribs on the dull upper surface of the leaf blade.” Whatever the status of *G. divisa*, the evidence for its inclusion in the Panamanian flora is inconclusive at best.



***Geonoma edulis* H. Wendl. ex Spruce**

Wessels Boer (1968) placed *Geonoma edulis* H. Wendl. ex Spruce in synonymy under *G. interrupta* (Ruiz & Pav.) Mart., and Henderson et al. followed Wessels Boer. Our examination of the holotype of *G. edulis* (*Wendland s.n.*, Costa Rica, Turrialba, 1857) has caused us to reappraise this synonymy. The holotype, though consisting only of an inflorescence, clearly does not represent *G. interrupta*. The flower pits have a distinct upper lip and the pits are glabrous within. Furthermore, the fruits are globose, rather than apiculate as in *G. interrupta*, and the inflorescence is less ramified. Rather, the type of *G. edulis* belongs to the species currently known as *Geonoma seleri* Burret (sensu Wessels Boer), a much more recent name. Thus we propose the following new synonymy:

***Geonoma edulis* H. Wendl. ex Spruce**

TYPE: COSTA RICA. Cartago: Turrialba, *Wendland s.n. 1857* (Holotype K!).

*Geonoma seleri* Burret

TYPE: GUATEMALA. Huehuetenango: Yalambhoch, *Seler 2757* (holotype, destroyed at B).

NEOTYPE: GUATEMALA. Alta Vera Paz: between Sepacuite and Panzas, 24 June 1904 *Cook & Doyle 327* (US, five sheets here designated).

Interestingly, plants of this montane species are commonly exploited in Costa Rica for their bitter, yet edible (when roasted) palm hearts. This is the only *Geonoma* species that the second author has heard mentioned in this connection, during nearly 20 years of field experience in Costa Rica.

Henderson et al. (1995) placed *G. seleri* in synonymy under *G. undata* Klotzsch (an older name even than *G. edulis*), restricted by Wessels Boer (1968) to South American and Caribbean material. However, we consider the evidence for this relationship to be inconclusive. Central American material (*G. seleri* sensu Wessels Boer, here treated as *G. edulis*) is uniformly characterized by short, stiff rachilla hairs, lacking in *G. undata* sensu Wessels Boer. We have studied a toptype of *G. undata* (*Davidse & Miller 28010*, MO) identified by Henderson in 1987.

***Geonoma epetiolata* H. E. Moore**

In 1980, H. E. Moore annotated a specimen from eastern Panama [*Hammel 3107* (MO), Prov.

Colón, Cerro Bruja as having the leaves of *Geonoma epetiolata*, but the "female flowers wrong." Moore suggested with a query that the specimen might represent a new species. In the original publication of *G. epetiolata*, Moore (1980) described and illustrated clearly an exerted, crenate staminodial tube. The staminodial tube of *Hammel 3107* is digitate. Examination of all available flowering material of *G. epetiolata* at CAS, F, MO, and US revealed that the Costa Rican and western Panamanian material (east to Santa Fe, the type locality) has crenate staminodial tubes, whereas material from east of Coclecito Road has digitate staminodial tubes. The two forms meet in the vicinity of El Copé and Coclecito Road, where both occur. The characters of staminodial tube lobing and exertion vary independently. *Geonoma epetiolata* is an unusually distinctive species, and no other characters appear to vary in correlation with staminodial tube lobing. We thus consider the variation in staminodial tube lobing described above as normal for this species. This would appear to be the first report of such extreme intraspecific variation in this taxonomically important character.

When *G. epetiolata* was described it was known only from the area of the type near Santa Fe in Veraguas province. It is now known from every Atlantic slope collecting locality in Panama east to Cerro Brewster (Comarca de San Blas), and west along the Atlantic slope to Volcán Barva, in Costa Rica.

***Geonoma ferruginea* H. Wendl. ex Spruce**

Wessels Boer (1968) and D'Arcy (1987a,b) listed *Geonoma ferruginea* H. Wendl. ex Spruce as occurring in Panama. Examination of all material at CAS, F, MO, NY, and US revealed no specimens from Panama. *Cooper 493* (F), cited by Wessels Boer as *G. ferruginea*, is better as *G. longevaginata*. A few other specimens of *G. longevaginata* from Panama were misdetermined as *G. ferruginea* and perhaps this is the source of the report by D'Arcy. Most of the Panamanian material of *G. longevaginata* is rather uniform, with a long peduncle, long rachillae, and large leaves. A mid-elevation, cloud-forest form with small leaves, short peduncles (3–10 cm), and few (3–6), short (10–20 cm) rachillae occurs at El Valle, El Copé, and Coclecito Road. This form is reported by Henderson et al. (1995) as *G. divisa* (see above).

### ***Geonoma jussieuana* Mart.**

In western Panama there are two distinct forms of *Geonoma jussieuana* Mart. In 10–20 m tall, closed-canopy forest between 1800 and 2300 m the plants have narrow, entire, deeply bifid leaves with the veins converging cyclanth-like at the tips of the lobes. At slightly higher elevations on exposed, wind-swept ridgetops in elfin forest 0.5–2 m tall the plants have consistently trijugate or more finely divided leaves with similar veins. In addition, the tall-forest form has cleanly deciduous leaves and a cane-like trunk, whereas the elfin forest form has persistent leaf bases, which disintegrate into a web of heavy fibers clothing the trunk. Neither flower nor fruit differences could be found.

### **Acknowledgments**

We are indebted to Kathy Bell for the excellent line drawings of *Geonoma hugonis* and *G. monospatha*, and to Donald R. Hodel for permission to use his fine photograph. Dr. Dale W. McNeal (UOP) kindly provided facilities for the il-

lustrator. We thank Mireya Correa A. for providing information on duplicates represented at PMA, and Rodrigo Bernal for information on duplicates at JAUM. We thank especially the curators of the following herbaria for loans of material pertinent to this study: CAS, F, MO, NY, US.

### LITERATURE CITED

- D'ARCY, W. 1987a. Flora of Panama checklist and index. Part I: The introduction and checklist. Monogr. Syst. Bot. Missouri Bot. Gard. 17: 1–325.
- . 1987b. Flora of Panama checklist and index. Part II: Index. Monogr. Syst. Bot. Missouri Bot. Gard. 18: 1–670.
- DE NEVERS, G. C. AND M. H. GRAYUM. 1995. A new species of *Geonoma* (Arecaceae) from Panama. Novon 5: 354–356.
- GRANVILLE, J.-J. DE. 1975. Un nouveau palmier en Guyane Française. Adansonia, n. s. 14: 553–559.
- HENDERSON, A., G. GALEANO, AND R. BERNAL. 1995. Field guide to the palms of the Americas. Princeton Univ. Press, Princeton, NJ.
- MOORE, H. E., JR. 1980. Two new species of *Geonoma* (Palmae). Gentes Herb. 12: 25–29.
- WESSELS BOER, J. 1968. The geomomoid palms. Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede Sect. 58(1): 1–202+.

---

## **Palms and People**

During the annual meeting of the Society for Economic Botany (SEB), which will be held at the University of Aarhus, Denmark, 13–17 July 1998, a special session will feature the theme “Palms and People”.

The meeting is open to nonmembers of the SEB. Further information can be found on the SEB website: <http://www.nybg.org/bsci/seb/SEB.html>

Registration for the meeting can be sent to: SEB Treasurer John Rashford, Dept. of Sociology and Anthropology, College of Charleston, Charleston, SC 29424, USA, email: [Rashfordj@cofc.edu](mailto:Rashfordj@cofc.edu)

Fees: nonmembers of SEB 105 USD, banquet 45 USD, accommodation 35 USD/night.

Abstract: before May 5, 1998, by email to [Henrik.Balslev@Biology.aau.dk](mailto:Henrik.Balslev@Biology.aau.dk) or by regular mail to Henrik Balslev, SEB-conference, Department of Systematic Botany, University of Aarhus, Nordlandsvej 68, 8240-Riiskov, Denmark.