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Notes on Geonoma in Mesoamerica

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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* (Poit.) Kunth. New observations are presented relevant to *Geonoma calyptrogynoidea* 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 funnelform, 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.

striate with ca. 7–9 nerves; staminodial tube ca. 2.0 mm, cylindrical, digitately lobed, the lobes 0.5–0.7 mm, subequal, barely exserted 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, 1450 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 exserted 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 strica 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 ×