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## Two New Species of *Chamaedorea* (Arecaceae) from Panama

MICHAEL H. GRAYUM AND DONALD R. HODEL

*Missouri Botanical Garden, Box 299, St. Louis, MO 63166, and  
University of California, 2615 S. Grand Ave., Suite 400, Los Angeles, CA 90007*

### ABSTRACT

*Chamaedorea deneversiana* and *C. verecunda* are described as new, the former from Veraguas Province and the Comarca de San Blas in central Panama, the latter from the La Fortuna region of Chiriquí Province in western Panama. Both are simple-leaved species of very wet, mid-elevation forests. Staminate and pistillate specimens of each species are illustrated with photographs.

This paper describes two new simple-leaved species of the genus *Chamaedorea* (Arecaceae) from wet forests of central and western Panama. It is among the last papers in a series (Hodel 1990b, 1990c, 1990d, 1991a; Hodel and Castillo Mont 1990, 1991; Hodel and Uhl 1990a, 1990b, 1990c) describing new taxa of *Chamaedorea* in preparation for the imminent publication of Hodel's (1991b) comprehensive account of the genus.

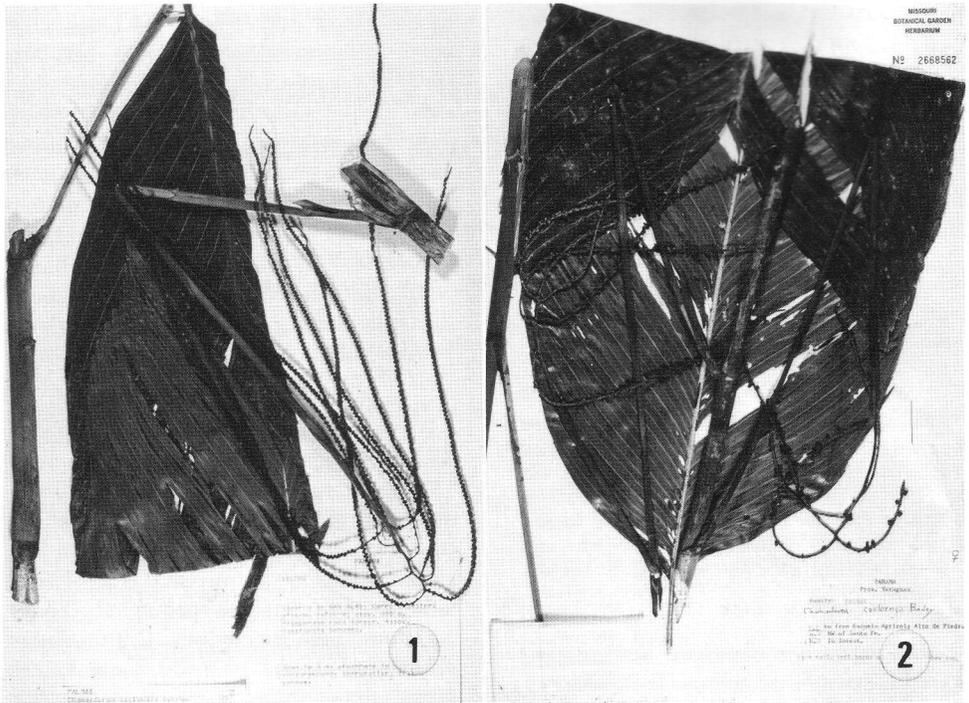
The two species described below are not closely related, probably belonging in separate subgenera according to the classification of Burret (1933). Both species are of very restricted distribution and unknown in cultivation, and must be regarded as endangered.

### *Chamaedorea deneversiana* Grayum & Hodel, sp. nov.

Caulis 1.5-3 m altus 1.3-1.6 cm diametro; petiolus ultra vaginam 14.4-45.9 cm longus; lamina simplex oblonga apice bifida secus costam 34.9-61.2 cm longa ad marginem lateralem versus apicem grosse serrata; lamina nervis utroque cos-

tae latere 20-24; inflorescentia mascula pedunculo ca. 40.9 cm longo rhachidi ca. 4.8 cm longa rachillis 10, pendentibus 25.4-33.1 cm longis; flores masculi 1.1-1.3 mm longi 1.8-1.9 mm lati corolla depresso-oblonga petalis enerviis vel obscure nervatis antheris ca. 0.6 mm longis pistillodii incudiformi ca. 0.4 mm longo; inflorescentia feminea pedunculo 18.3-59.8 cm longo rhachidi ca. 2.3 cm longa rachillis (3?)4-6, 10.2-30.2 cm longis; flores feminei 2.2-2.5 mm longi 2.5-2.8 mm lati lobis corollae extus obscure nervatis intus prominenter ca. 15-nerviis pistillo 1.5-1.9 mm longo; fructus late ellipsoideis in sicco 6.8-7.5 mm longis 5.6-5.8 mm latis. TYPUS: Panama. San Blas: Cerro Brewster, 9°18'N, 79°16'W, 850 m, *de Nevers et al.* 5553A (holotype, MO; isotype, CAS). Figures 1,2.

Stem prostrate to erect, probably solitary (but no data), 1.5-3 m tall, the internodes 5.5-12.3 cm long, 1.3-1.6 cm wide. Leaves 4 (*Mori & Kallunki* 5352). Sheath ca. 19-26 cm long; rest of petiole 14.4-45.9 cm long. Lamina simple, oblong, bifid apically, 34.9-61.2 cm along midrib, 15.6-17.1 cm along upper margin, 12.4-25.0 cm between apices of lobes; lateral margins coarsely serrate toward apex; major veins 20-24 per side, knife-edge-raised above, prominent below, the larger ones somewhat erose-margined; midrib broad and yellowish below, overhanging and scurfy-roughened laterally. Inflorescences infrafoliar, borne to at least 1 m below crown (*Mori & Kallunki* 3208).



1. *Chamaedorea deneversiana* (de Nevers et al. 5553A); staminate specimen. 2. *Chamaedorea deneversiana* (Mori & Kallunki 3208); pistillate specimen.

Staminate inflorescence (just one seen) branched, with drooping rachillae; peduncle 40.9 cm long, bearing 6 bracts; rachis 4.8 cm long, slightly zigzag; rachillae 10, 25.4–33.1 cm long. Staminate flowers 1.1–1.3 × 1.8–1.9 mm at anthesis; calyx 0.3–0.4 mm high, lobed ca. halfway to base, the lobes hyaline, nerveless; corolla depressed-oblate, the petals valvate in bud, nerveless or obscurely nerved, apparently free at anthesis; stamens 6, the anthers ca. 0.6 mm long, somewhat reniform; pistillode stout, ca. 0.4 mm long, anvil-shaped. Pistillate inflorescence branched, the axes becoming yellow to orange in fruit; peduncle 18.3–59.8 cm long, bearing 5–6 bracts; rachis ca. 2.3 cm long, slightly zigzag; rachillae (3?) 4–6, 10.2–30.2 cm long. Pistillate flowers 2.2–2.5 mm long at anthesis; calyx 0.5–0.6 × 2.5–2.8 mm, moderately 3-lobed, the lobes 5-nerved;

corolla suburceolate, constricted toward the base where the lobes are fused in a tube ca. 0.2–0.3 mm high, the lobes obscurely nerved externally, prominently ca. 15-nerved within; staminodes not observed; pistil 1.5–1.9 mm long, the style trifid. Fruits broadly ellipsoidal, 6.8–7.5 × 5.6–5.8 mm when dry, described as “green” (Mori & Kallunki 5352) or “yellow” (de Nevers et al. 5553B) hence presumably immature.

*Additional Specimens Examined.* PANAMA. SAN BLAS: Cerro Brewster, 9°18'N, 79°16'W, 850 m, de Nevers et al. 5435 (MO), 5553B (CAS, MO). VERAGUAS: vicinity of Escuela Agrícola Alto de Piedra, Mori & Kallunki 3208; NW of Santa Fe, Mori & Kallunki 5352 (MO).

*Distribution and Phenology.* *Chamaedorea deneversiana* is known from just five collections, three from the Cerro Brew-

ster region of the Comarca de San Blas, and two others from the vicinity of Cerro Tute, Veraguas Province. These are both very wet sites near the Continental Divide in central Panama. Only one of the specimens (*de Nevers et al.* 5553A) is staminate. The species was first collected in 1974 by S. Mori and J. Kallunki. Habitat data for *C. deneversiana* are practically nonexistent; *Mori & Kallunki* 5352 grew on a "rocky streambank." Fertile specimens have been collected from November through April.

*Chamaedorea deneversiana* possibly belongs in subgenus *Chamaedorea*, on the basis of its relatively small staminate flowers on long, slender, drooping rachillae (Fig. 1). Typically, in this subgenus, the staminate petals are apically connate and prominently nerved; the single staminate specimen of *C. deneversiana* may have somewhat immature flowers.

Specimens of *Chamaedorea deneversiana* have been misidentified as "*C. coclensis* L. Bailey" (= *C. amabilis* H. A. Wendl. ex Dammer; Hodel 1990a), an ostensibly related species occurring in similar habitats from Costa Rica south to the Chocó. Indeed, the two species bear a striking resemblance in their simple, relatively shallowly bifid leaves with a peculiar, oblong shape, prominently serrate margins and numerous lateral veins. However, *Chamaedorea deneversiana* is a taller palm with larger leaves and more numerous and considerably longer staminate rachillae, which are drooping rather than erect as in *C. amabilis*. Furthermore, the pistillate inflorescences of *C. deneversiana* are branched, with 4–6 rachillae (Fig. 2), whereas those of *C. amabilis* are simple, or occasionally bifid.

The new species is dedicated to Gregory C. de Nevers, collector of three of the five known specimens, whose pioneering botanical explorations in the Comarca de San Blas and special interest in palms have forged a sterling contribution to Panamanian floristics.

***Chamaedorea verecunda* Grayum & Hodel, sp. nov.**

Caulis gracilis 50–75 cm altus 3.5–5.0 mm diametro; petiolus ultra vaginam 1.7–4.4 cm longus; lamina simplex obovata profunde bifida secus costam 2.75–5.40 cm longa ad marginem lateralem versus apicem crenata vel serrata; lamina nervis utroque costae latere 6–9; inflorescentia mascula spicata pedunculo 13.3–18.9 cm longo rhachidi 6.5–9.7 cm longa maturatione florum basipeta; flores masculi lutei cernui 3.6–5.1 mm longi 1.7–2.0 mm lati corolla anguste campanulata lobis corollae sub anthesi apice liberis fere enervibus ovatis 2.6–3.3 mm longis 1.8–1.9 mm latis apice rotundatis vel subacutis antheris 1.2–1.5 mm longis pistillodio 2.3–2.8 mm longo; inflorescentia feminea spicata pedunculo 14.3–22.1 cm longo rhachidi 4.2–5.4 cm longa maturatione florum basipeta; flores feminei lutei cernui 2.1–2.3 mm longi 1.6–1.7 mm lati corolla late campanulata vel suburceolata lobis corollae obscure 5–7-nervatis late ovatis pistillo (supra insertionem loborum corollarum) 1.8–2.2 mm longo; fructus in sicco usque ad minimum 1 cm longis. TYPUS: Panama. Chiriquí: N. of Hornito, 4,200 ft., *Hammel* 6221 (holotype, MO-3622575). Figures 3,4.

Small, slender palm ca. 50–75 cm tall, lacking stilt-roots (*Kirkbride & Duke* 942), the "trunk often decumbent" (*Hammel* 2254), probably solitary (but no data). Internodes surpassed by sheaths, 1.7–3.8 cm long, 3.5–5.0 mm wide. Leaves ca. 8–11, "grey-green" (*Hammel* 6221). Sheath 2.2–5.3 cm long, rather loose, oblique at orifice, the veins prominent and obscurely nodulose; rest of petiole 1.7–4.4 cm long. Lamina simple, obovate, deeply bifid, 2.75–5.40 cm along midrib, 6.3–9.7 cm along upper margin, 7.7–10.1 cm between apices of lobes; lateral margins crenate to serrate, especially toward apex; major veins 6–9 per side, knife-edge-raised on both



3. *Chamaedorea verecunda* (Hammel 6221); staminate specimen. Note basipetal maturation of flowers, those in the upper half of the spike having already fallen off. 4. *Chamaedorea verecunda* (Kirkbride & Duke 942); pistillate specimen.

surfaces. Inflorescences of both sexes spikeate, interfoliar. Staminate inflorescences (two seen) with peduncle included in sheath of subtending leaf, 13.3–18.9 cm long, bearing 2–3 bracts; rachis 6.5–9.7 cm long, the flowers maturing basipetally. Staminate flowers yellow, 3.6–5.1 mm long at anthesis, nodding; calyx ca. 0.5–1.0 × 1.7–2.0 mm, truncate or merely notched apically, hyaline, nerveless; corolla narrowly campanulate, narrowed at base where the lobes are fused in a tube ca. 1.1–1.6 mm high, the lobes valvate in bud, free at anthesis, virtually nerveless, ovate, 2.6–3.3 × 1.8–1.9 mm, rounded to obtuse or subacute apically; stamens 6, the anthers 1.2–1.5 mm long, narrowly ovate, somewhat narrowed apically, subsagittate at the base, the thecae loosely attached, dehisc-

ing longitudinally, the filaments very short (0.1–0.4 mm) and attached at base of pistillode; pistillode prominent, 2.3–2.8 mm long, much surpassing stamens, clearly differentiated into a style and somewhat lobed stigma. Pistillate inflorescence (three seen) with peduncle 14.3–22.1 cm long, bearing 2–3 bracts; rachis 4.2–5.4 cm long, the flowers maturing basipetally. Pistillate flowers yellow, 2.1–2.3 mm long at anthesis, nodding; calyx similar to that of staminate flowers, 0.4–0.5 × 1.6–1.7 mm, truncate or somewhat sinuate apically; corolla broadly campanulate to suburceolate, rather abruptly (more so than staminate corollas) narrowed at the base where the lobes are fused in a tube ca. 0.4 mm long adnate to the basal part of the pistil, the lobes imbricate in bud, obscurely 5–

7-nerved (much more clearly than in staminate corollas), broadly ovate, 1.5–1.7 × 1.6–1.8 mm; staminodes not observed; pistil (part above insertion of corolla lobes) 1.8–2.2 mm long, narrowed above in a thickened style with 3 stigmas. Fruits to at least 1 cm long (when dry).

*Additional Specimens Examined.* PANAMA. CHIRIQUI: *de Nevers et al.* 8807 (CAS); La Fortuna hydroelectric project, 1,200–1,400 m, *Hammel 2124* (MO), 2254 (MO); cloud forest between Q. Hondo (sic) and divide, *Kirkbride & Duke 942* (MO).

*Distribution and Phenology.* *Chamaedorea verecunda* is presently known from just five specimens, all from cloud forests near the Continental Divide at 1,200–1,400 m elevation in the general vicinity of the La Fortuna hydroelectric project, Chiriquí Province, Panama. It was first collected by J. Kirkbride and J. Duke in 1968. Habitat data are limited. *Hammel 2124* and 2254 were both collected “in forest,” whereas *Hammel 6221* was growing “on (a) forested ridge along (a) small stream.” The species may be regarded as broadly restricted to the La Fortuna region, which is known to harbor many endemic plant species. Fertile specimens have been collected from February through April.

*Chamaedorea verecunda* belongs in subgenus *Chamaedoropsis*, on the basis of its relatively large staminate flowers with the corolla lobes nerveless and apically free at anthesis. This is one of the most distinctive of the numerous dwarf, simple-leaved, cloud-forest *Chamaedorea* species now known from Central America. It may be easily recognized by its caulescent habit; very small, broad, deeply bifid laminae with few lateral veins; spicate inflorescences in both sexes; and nodding, basipetally maturing flowers, the staminate ones relatively large and with a prominent pistilode (Figs. 3,4).

Most specimens of *Chamaedorea verecunda* have been previously identified as *C. pumila* H. A. Wendl. ex Dammer, a

widespread Costa Rican species. The latter, however, is acaulescent, has relatively narrower and less deeply bifid laminae with more numerous lateral veins, and has four or more staminate rachillae.

The closest relatives of *Chamaedorea verecunda* are undoubtedly the recently described *C. correae* Hodel & Uhl and *C. guntheriana* Hodel & Uhl (1990c), which occur in similar habitats in central Panama. *Chamaedorea correae*, known from several localities in Coclé, Colón and Veraguas Provinces, appears to be a coarser, taller palm than *C. verecunda*, with somewhat larger leaves. Both staminate and pistillate rachillae of *C. correae* are much longer than their counterparts in *C. verecunda*; moreover, the staminate inflorescence of *C. correae* normally consists of 2–3 rachillae (it may rarely be spicate). The staminate flowers of *Chamaedorea correae* are considerably smaller (ca. 2.5 mm long at anthesis) than those of *C. verecunda*, with correspondingly smaller anthers (1.2–1.5 mm) and pistillodes (1.5–2 mm), and mature simultaneously rather than basipetally.

*Chamaedorea guntheriana*, which is apparently endemic to the Cerro Jefe region, differs from *C. verecunda* in its usually pinnate, markedly coriaceous leaves, usually bifid staminate inflorescences with somewhat longer rachillae, and smaller (2.5 mm long) staminate flowers with much smaller anthers (0.5 mm). In addition, the staminate flowers of *C. guntheriana* mature acropetally, rather than basipetally as in *C. verecunda*.

We suggest that *Chamaedorea verecunda*, *C. correae*, *C. guntheriana* and perhaps other related cloud-forest species of similarly restricted geographic range ultimately derive from a single, wide-ranging ancestral species, from which they have speciated allopatrically in the isolated cordilleras of Panama and adjacent regions.

The specific epithet derives from the Latin *verecundus*, meaning “modest” or “shy,” and alludes to various attributes of

these plants, including their small size, nodding flowers and apparent scarcity.

### Acknowledgments

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### Notes on the Front Cover Picture

*Chamaedorea tenerrima* Burret has one of the most striking leaves in the genus and, perhaps, in the entire palm family. In addition to the unusual, broadly flared terminal lobes and reflexed lower pinnae, each leaflet has a distinctive auricle at its base that forms a small spur shooting through mid-air and across the underside of the rachis. It's difficult to imagine that these plants first develop fairly large, simple leaves; in fact, they often flower ini-

tially with undivided leaves. *C. tenerrima* grows in dense, mountain rainforest and cloud forest in Alta Verapaz, Guatemala. Rain, mist, clouds, fog, and cool temperatures characterize this area. We found this specimen, *Hodel & Castillo 1009*, with three simple-leaved species, *C. simplex*, *C. tuerckheimii*, and *C. castillo-montii*. Photo by Donald R. Hodel.

DON HODEL