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Additions to Chamaedorea Palms: New Species from Mexico and Guatemala and Miscellaneous Notes

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As *Chamaedorea Palms: The Species and Their Cultivation* (Hodel 1992) went to press, I was aware of several additional but elusive taxa that perhaps represented new species but which I did not include as separate entities in that monograph since sufficient information to describe and name them adequately was lacking. However, during the time the book was being readied for the presses and until it was actually printed, additional information came to light and I am now able to describe and name four new taxa, one of which is cultivated. The new species are named, described, and discussed, and a note is made of where they would key out in *Chamaedorea Palms* in relation to existing species. Also, the distribution of *Chamaedorea elegans*, including the first record of it on the Pacific slope, and a name for a hybrid recently released to the industry are discussed briefly. The new information is presented here to update *Chamaedorea Palms*.

Chamaedorea benziei D. R. Hodel **sp. nov.** (Figs. 1–4).

Subgeneris *Chamaedoropsi* Oerst. inflorescentiis masculis solitariis, floribus masculis solitariis petalis patentibus apicalter. *C. carchensi* Standl. & Steyerm. affinis sed inflorescentiis masculis inter folia, bracteis numerosioribus, rachillis masculis numerosioribus, foliis numerosioribus et brevioribus, petiolis brevioribus et sine tomentiis atis, vaginis majis clausis sine costis prominenter elevatis, pinnis crassioribus differt. *C. woodsonianae* L. H. Bailey affinis sed pinnis paucioribus, crassioribus, nervis paucioribus et minus prominentibus non elevatis et carinatis infra pinnam, petiolis laevibus non foveatis differt. Typus: Cult., *Hodel et al. 1143* (holotypus BH; isotypi CAS, MEXU).

Solitary (Fig. 1), to 5 m tall, erect, ±robust. Stem 2.5–3.5 cm diam., green, prominently ringed, nodes swollen, internodes 3–10 cm long. Leaves 6, pinnate, spreading; sheath 47 cm long, 0.5 cm thick, robust, deeply split in apical half opposite the petiole and there brown-margined, tubular in basal half, densely longitudinally striated, lacking a raised central costa; petiole 33 cm long, 1.5 cm diam., robust, rounded-triangular in x-section, slightly grooved adaxially, rounded with a distinct but pale yellow band abaxially; blade 130 × 100 cm; rachis 125 cm long, round-angled adaxially, rounded with a distinct but pale yellow band abaxially; 20–22 pinnae on each side of rachis, lower middle ones the largest, these to 60 × 5.5 cm, pinnae becoming progressively shorter toward apex of blade and there to 35 × 2.5 cm, end pair often slightly wider, all pinnae straight, only slightly falcate, thick, leathery, slightly drooping, dark nearly bluish green with a slight glaucous bloom, a prominent central midrib light yellow and raised adaxially, abaxially raised and yel-

low only in basal ⅓ of pinna, only slightly raised and greenish in apical ⅔ of pinnae abaxially, all other nerves much less conspicuous adaxially and abaxially, basically 2 lateral primary nerves (1 of these submarginal) on each side of midrib, 3 secondaries between each primary and midrib or 2 primaries, tertiaries inconspicuous, all nerves except midrib translucent yellow when the pinnae are held up to the light, a hard raised swollen knot at point of attachment adaxially.

Inflorescences interfoliar, perhaps infrafoliar in fruit, erect to spreading, robust; peduncles to 145 cm long, 5 cm wide at base and there flattened, 1.5 cm diam at apex and there oval in x-section, green where exposed; bracts 10–11, prophyll 9 cm long, 2nd bract 12 cm, 3rd 18 cm, 4th 23 cm, 5th 28 cm, 6th 30 cm, 7th 37 cm, 8th 40 cm, 9th 48 cm, 10th 40 cm, 11th 25 cm, lower ones bifid, apical ones acute-acuminate, tightly sheathing, obliquely open apically, longitudinally striated, apical 18 cm of peduncle exposed and pendulous with 3 visible scars. Staminate (Fig. 2) with rachis to 40 cm long, spiralled-s-downward- or horizontal-pointing, green; rachillae 75, ±radiating in whorls from rachis ca. every 3 cm, whorls mostly of 5 rachillae each, apical 3 whorls of 4 rachillae, basal whorl of 2 rachillae, lower rachillae longest, these to 25 cm long, progressively shorter toward apex of rachis and there to 5 cm long, rachillae reflexed off rachis, ±stiff, spreading, erect but drooping slightly apically at anthesis, mostly simple but a few of basal rachillae 2–3 branched. Pistillate (Fig. 3) with rachis to 28 cm long, green in flower; rachillae 15–50, lower ones longest, to 15 cm long, ±stiff, curved, ascending, parallel, green in flower, longitudinally ridged when dry, upper ones simple but lower ones sometimes branched with up to 4 rachillae per branch.

Staminate flowers (Fig. 4) in moderate spirals, 2–6 mm apart, 3.5–3.75 × 2 mm in immature bud (green with corolla closed), at early anthesis 4 × 5 mm, obovoid, yellow, sunken in elliptic depressions 1.5–2.5 × 1–1.5 mm; calyx 1 × 1.75–2 mm, dark brown, sepals free nearly to base or connate in basal ¼, broadly rounded to narrowly rounded apically; petals 4 × 3.5 mm, ovate, valvate, free to base, initially connate apically and there adnate to pistillode briefly, but then eventually spreading slightly, but remaining cupped inward, acute, 0.5 mm thick; stamens 3.5–3.75 mm high, ca. equalling pistillode and petals, filaments 1.5–2 mm long, clear-colored, anthers 2–3 mm long, held ca. as high as pistillode, long-oblong, dorsifixed near base; pistillode 3.5–3.8 mm high, columnar, longitudinally fluted, yellowish. Pistillate flowers in moderate to remote spirals 3–8 mm apart, in bud 1.5 × 2 mm, globose, after anthesis 2 × 3 mm, depressed-globose, in ±superficial oval to elliptic depressions 2 × 1–1.5 mm; calyx 0.75–1 × 2–2.5 mm, moderately to deeply lobed, sepals connate and/or imbricate in basal ¼–½, very broadly rounded to nearly straight apically; petals 1.5–2.5 × 2–2.5 mm triangular, strongly cupped, tightly imbricate in basal ½–¾, acute, tips incurved, a prominently raised costa abaxially; staminodes short to long, toothlike; pistil 1–2 × 1.5–2.5 mm, globose, stigma lobes short, recurved, broad but not too discernible. Fruits not seen.

Distribution: MEXICO. Chiapas. Montane rain forest and pine-oak-liquidambar forest on the Pacific slope; 1,500–1,600 m elev.

Specimens Examined: MEXICO. Chiapas: Cintalapa, Cerro Baul, 16 km NW of Rizo de Oro along logging road to Colonia Figueroa, *Breedlove 21731, 31380* (CAS); Villa Corzo, E. base of Cerro Tres Picos near Cerro Bola, *Breedlove 24101* (CAS). CULTIVATED U.S.A. California: San Diego County, Oceanside, Ingwersen Nursery, *Hodel et al. 1143* (holotype BH; isotypes CAS, MEXU), *785* (BH, flowers in FAA only); Los Angeles County, Los Angeles, nursery of D. Barry, Jr., *Barry*


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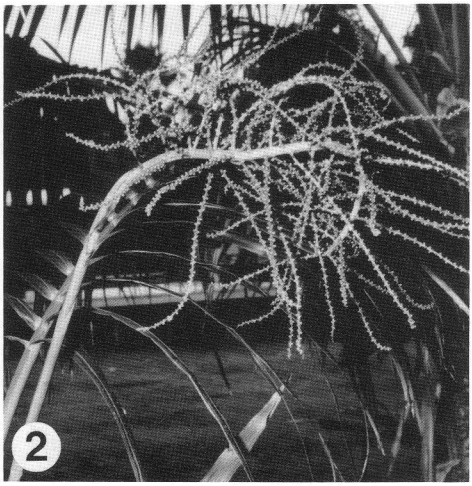
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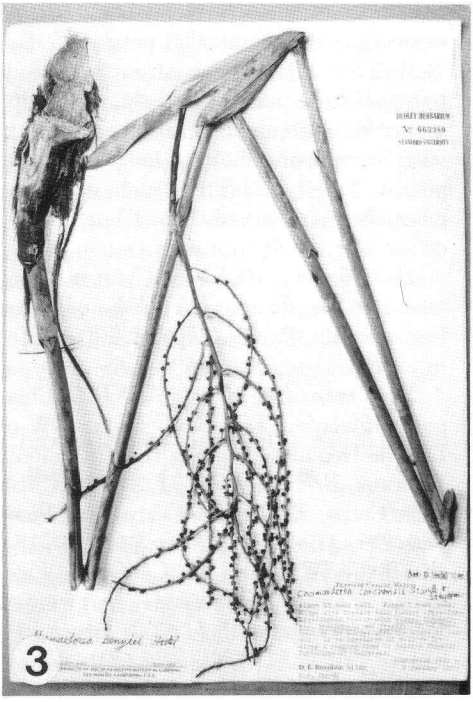
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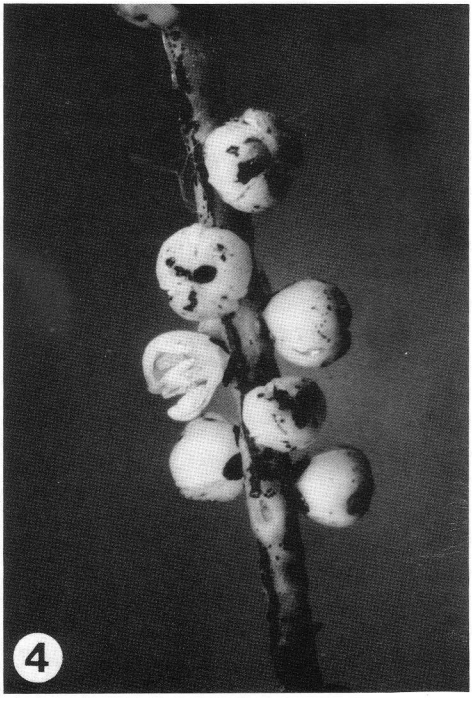
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s. n. (BH); cultivated material originally collected in southwest Mexico by Tom MacDougall and grown for many years by the late David Barry, Jr. in Los Angeles.

The specific epithet honors James Benzie of Orange, California, my friend and ardent collector and grower of palms for many years, who assisted in collecting the type.

Chamaedorea benziei is an unusual species with pinnae that are among the thickest in the genus. Pinnae and petioles are lightly but noticeably covered with a waxy, glaucous bloom. *C. benziei* appears closest to *C. carchensis* and *C. woodsoniana*. *C. carchensis* differs in its infrafoliar inflorescences with fewer bracts, much fewer staminate rachillae, more membranous and shallowly lobed staminate calyx, shorter anthers, fewer and longer leaves, longer petioles with conspicuous black tomentum, and more open leaf sheaths tubular only near the base and with a prominently raised costa. *C. woodsoniana* differs in its more numerous and more prominently nerved pinnae with five raised, keeled nerves abaxially and petioles with small, densely packed, irregular pits giving living material a rough texture.

Staminate flowers of *C. benziei* are similar to those of *C. seifrizii* and *C. pochutlensis* (both subgenus *Chamaedoropsis*) in that the petals spread apically only slightly, the tips remaining incurved over the stamens and are adnate or nearly so to the tip of the pistillode. In this regard, these three species approach *C. hooperiana*, *C. elatior*, and *C. graminifolia* (all in subgenus *Chamaedorea*), in that the latter three have petals which are connate apically at anthesis but then later often spread slightly. The six species tend to blur the boundaries of these two subgenera; more work is needed to circumscribe subgeneric characters more adequately.

Chamaedorea benziei would key out next to *C. woodsoniana* in the key to the species of subgenus *Chamaedoropsis* and next to *C. linearis* in the vegetative key to the cultivated species of *Chamaedorea* in Hodel (1992). Differences with *C. woodsoniana* were noted above; *C. linearis* differs in its thinner pinnae usually with more primary nerves, thinner sheaths, and, being in subgenus *Morenia*, has multiple staminate inflorescences, staminate flowers arranged in groups, and red fruits.

In the 1950s, the late David Barry, Jr. of Los Angeles grew the only plants known in cultivation from seeds that Tom MacDougall had collected in southwest Mexico without a specific locality. Apparently, Barry later sold his only surviving plant to Jack Ingwersen in Oceanside, California, and that specimen from which the type originated still exists in the Ingwersen Nursery.

Chamaedorea ibarrae D. R. Hodel **sp. nov.** (Figs. 5,6).

Subgeneris *Chamaedoropsi* Oerst. inflorescentiis masculis solitariis, floribus masculis solitariis petalis patentibus apicaliter. *C. nubio* Standl. & Steyerm. et *C. skutchii* Standl. & Steyerm. affinis sed habitu acaulibus brevioribus differt. *C. nubio* affinis sed habitu solitariis, foliis pinnatis pinnis strictis, floribus femineis sine staminodiis differt. *C. skutchii* affinis sed pinnis strictis, floribus femineis fere contiguis, calycibus femineis lobatis plus leviter, petalis femineis maginibus pallidis. Typus: Mexico, Chiapas, *Breedlove 11706*

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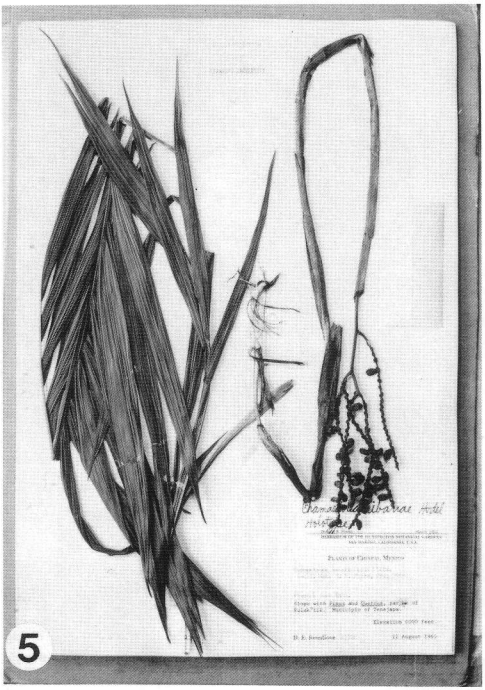
1. Plant at Ingwersen Nursery, Oceanside, California, from which holotype of *Chamaedorea benziei* was collected, *Hodel et al. 1143*. 2. Staminate inflorescence of *Chamaedorea benziei, Hodel et al. 1143*. 3. Pistillate inflorescence of *Chamaedorea benziei, Breedlove 31380*. 4. Staminate flowers of *Chamaedorea benziei, Hodel et al. 1143*.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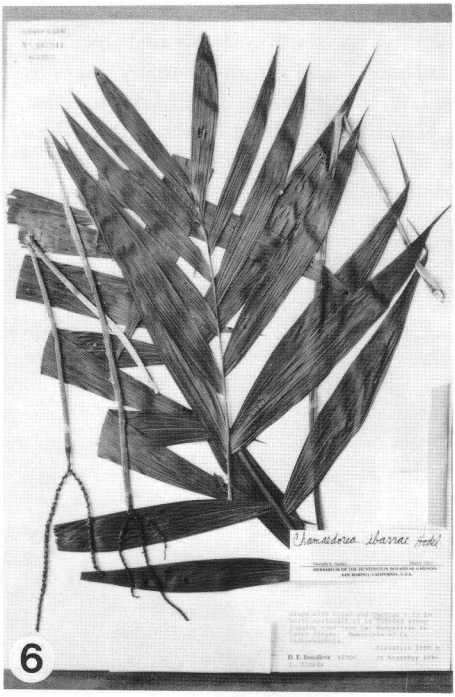
Chamaedorea ibarrae Hodel
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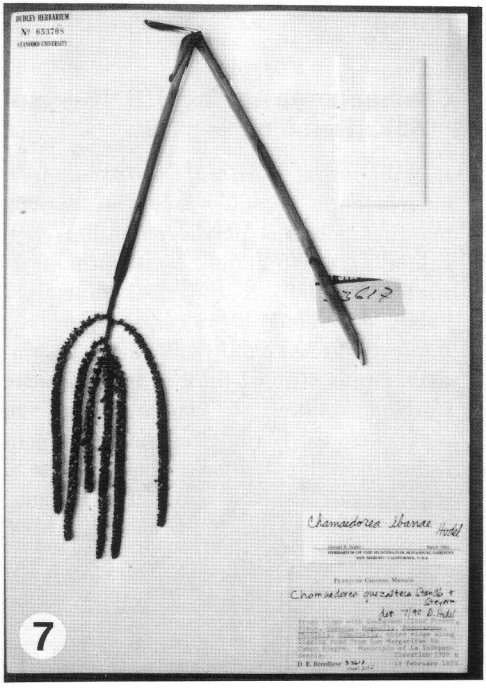
DUKE'S HERBARIUM
No 653708
Chamaedorea ibarrae Hodel
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[holotypus CAS (Fig. 5); isotypi BH, F, MICH].

Solitary, short, to 1–1.5 m overall height including leaves. Stem usually lacking but with age to 30 cm tall. Leaves 1–2 m long, pinnate, ascending to spreading, often appearing to arise from the ground, distichously arranged? (*Ton 398*); sheath not seen; petiole to 26 cm long or more, lightly grooved adaxially, rounded and pale abaxially, longitudinally striated laterally; rachis 50 cm long, angled adaxially, rounded abaxially; pinnae (Fig. 6) to 17 or more on each side of rachis, lower ones largest, these to 24 × 2.5–3 cm, becoming progressively shorter especially in apical fifth of rachis to 18–22 × 1–2 cm, terminal pair 15 × 2.3 cm, regularly or occasionally irregularly spaced, all pinnae straight, acuminate, only slightly falcate, plicate when dry and strongly cupped downward or inverted-v-shaped at point of attachment to rachis, a prominent midrib raised and yellow adaxially and abaxially, ±keeled adaxially, rounded abaxially, a prominent primary nerve on each side of the midrib and placed toward margin, 4 secondaries between primary and midrib and 1–2 secondaries outside of primary or 2 primaries on each side of midrib with 1–2 secondaries between each primary and midrib, nerves are more prominent and yellow abaxially than adaxially.

Inflorescences erect from the base, often from the ground or leaf litter, straight, erect, few-branched. Staminate (Figs. 6,7) peduncle at least 40 cm long (only portion seen); bracts as in pistillate; rachis lacking or to 2 cm long; rachillae 3–6, to 15 cm long, 1–1.5 mm diam., ±stiff?, parallel, densely flowered (Fig. 7), slightly flexuous. Pistillate (Fig. 5) with peduncles to 70 cm long, straight, 5 mm wide at base and ±flattened, 3–4 mm diam. at apex; bracts 11–12, prophyll 2–3 cm long, 2nd bract 3 cm, 3rd 5 cm, 4th 6.5 cm, 5th 9 cm, 6th 9 cm, 7th 12 cm, 8th 16 cm, 9th 18 cm, 10th 19 cm, 11th 12 cm, sometimes a rudimentary 12th bract concealed by the 11th one, uppermost bracts not exceeding peduncle, lower ones fibrous, tattered, upper ones tubular, obliquely open, round-acute, bifid, longitudinally nerved; rachis to 4 cm long; rachillae 3–6, to 13 cm long, 1.5–2 mm diam., stiff, parallel, strongly undulate when dry, perhaps downward-pointing when heavily laden with fruits.

Staminate flowers ± densely placed in bud, 0.5–1 mm apart, 1.5 × 1 mm, ovoid-globose or bullet-shaped, contiguous at anthesis and 3 × 3–4 mm, obovoid to oval, distinctly sunken in round-elliptic pits 1.5–2.5 × 1 mm, pits with liplike margins; calyx cupular, 0.5–0.75 × 2–3 mm, membranous, shallowly lobed, sepals connate in basal ½–¾, rounded apically; petals 1.75–3 × 1.5–2 mm, ovate, valvate, free nearly to base, spreading, erect, acute, not nerved; stamens 1.75–2 mm long, filaments 0.5–1 mm long, whitish, anthers to 1 mm long, tightly appressed around pistillode, dorsifixed, pistillode equalling stamens, 2–2.5 mm high, columnar. Pistillate flowers in densely placed spirals, nearly contiguous especially in middle and apical part of rachilla or more loosely spaced basallly, 1.25–2 × 2.5–4 mm, subglobose to depressed-globose (intermediate between hemispherical and shield-like), slightly to deeply sunken in elliptic depressions 3.25 × 1.25–2.25 mm usually with a raised liplike rim around each depression; calyx 0.5–1 × 2.5–4 mm, ca. half as high as corolla, very shallowly lobed, sepals imbricate and or connate in basal

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5. Holotype of *Chamaedorea ibarrae*, *Breedlove 11706*. 6. Staminate inflorescence (in bud) and leaf of *Chamaedorea ibarrae*, *Breedlove & Almeda 47906*. 7. Densely flowered staminate inflorescence (at anthesis) of *Chamaedorea ibarrae*, *Breedlove 33617*. 8. Plant of *Chamaedorea keeleriorum*, *Hodel & Castillo 988*.

¾, very broadly rounded to truncate (straight) apically, margins membranous; petals 1.5 × 2.5–3 mm, broadly triangular, tightly imbricate nearly to apex, becoming more separated in fruit and then corolla more deeply lobed, acute to nearly straight or broadly rounded, only faintly nerved adaxially, margins membranous; pistil 1.5 × 2.5 mm, depressed-globose, drying and shrinking to ovoid, stigma lobes short, recurved, separated. Fruits 8–10 × 5–7 mm, obovoid black when mature.

Distribution: MEXICO. GUATEMALA. Rocky substrate in montane rain and cloud forest or pine-oak-liquidambar forest mostly on the Atlantic slope, infrequently on the Pacific slope; 1,600–2,600 m elev.; usually on limestone on Atlantic slope.

Specimens Examined: MEXICO. Chiapas: La Independencia, logging road from Las Margaritas to Campo Alegre, *Breedlove 33617, Breedlove & Almeda 47906* (CAS); Tenejapa, Kulak'tik, *Ton 398* (CAS), *Breedlove 11706* (holotype CAS; isotypes BH, F, MICH); Zinacantan, Chivero, *Laughlin 1041* (BH, CAS, F); Motozintla, SW side of Cerro Mozotal, 11 km NW of jct. of road to Motozintla along road to El Porvenir and Siltepec, *Breedlove 41649* (CAS); Escuintla, *Matuda 30180* (MEXU). GUATEMALA. Huehuetenango: Sierra de los Cuchumatanes, Cerro Canana, *Steyermark 49018* (F).

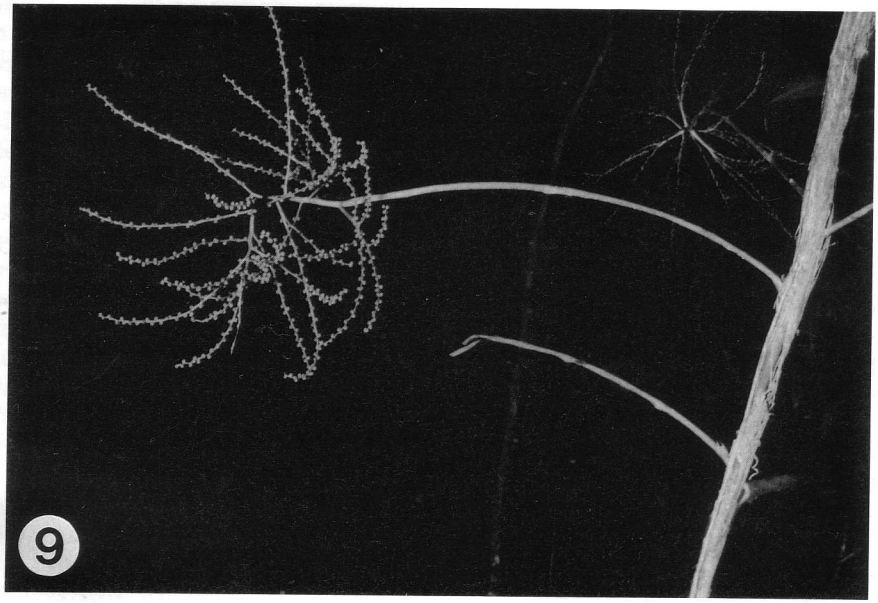
The specific epithet honors Mexican botanist Guillermo Ibarra-Manriquez of the National Autonomous University of Mexico (UNAM). The vernacular name is *cib*, which is also used for other species of *Chamaedorea* in the area. Unfortunately, not much is known about the habit of *Chamaedorea ibarrae* but judging from label data of *Ton 398*, the species is apparently a low, nearly stemless plant with more or less stiff, erect leaves and inflorescences arising from the ground or leaf litter. Only with age does the species form a short, visible, above-ground stem. In habit, *C. ibarrae* appears to be very close to *C. radicalis* but the latter differs vastly in the staminate flowers in short acervuli (lines) of 3–4 flowers each, deeply lobed calyx, outwardly spreading stamens equalling or exceeding the petals, and red fruits.

The Guatemalan specimen referred here differs slightly from the Mexican material in the slightly larger flowers and the shallower floral pits.

Chamaedorea ibarrae is probably closest to *C. nubium* and *C. skutchii* from which it differs in its nearly trunkless habit. Also, *C. nubium* differs in its cespitose habit, low shieldlike pistillate flowers with staminodes, and bifid leaves (if pinnate then slightly sigmoid pinnae). *C. skutchii* differs in the fewer, sigmoid pinnae and loosely arranged pistillate flowers with more deeply lobed calyx and smaller petals drying with a dark margin. In the key to the species of subgenus *Chamaedoropsis* in Hodel (1992), *C. ibarrae* would key out next to *C. carchensis* which differs substantially in the larger habit, much larger leaves with more pinnae, black indument covering the petioles, and larger and more numerous rachillae. *C. ibarrae* also appears close to *C. volcanensis* from the Pacific slope of Guatemala in habit and inflorescence. However, the latter differs in the fewer, much broader, sigmoid pinnae with several prominent nerves drying yellowish and the very prominent, deeply lobed staminate calyx.

Chamaedorea keeleriorum D. R. Hodel & J. J. Castillo Mont **sp. nov.** (Figs. 8–10).

Subgeneris *Chamaedoropsi* Oerst. inflorescentiis masculis solitariis, floribus masculis solitariis petalis patentibus apicaliter. *C. whitelockianae* Hodel & Uhl affinis sed habitu grandioribus, foliis grandioribus, pinnis numerosioribus et grandioribus, inflorescentiis infra folia, rachillis numerosioribus, rhachidibus femineis ramosis, calycibus masculis lobatis prominentibus profundis differt. Typus: Guate-



9. Inflorescence of *Chamaedorea keeleriorum* with lower rachillae branched, *Hodel & Castillo 911* (holotype). 10. Infructescence of *Chamaedorea keeleriorum* with simple rachillae, *Hodel & Castillo 988.*

mala, Quetzaltenango, *Hodel & Castillo 911* (holotypus BH, isotypus AGUAT).

Solitary (Fig. 8), to 5 m tall, slender, erect. Stem 1.5–2.5 cm diam., smooth, green, ringed, internodes to 15 cm long, often covered with old persistent sheaths. Leaves 3–4, ascending to spreading, pinnate; sheath to 35 cm long, tightly clasp-

ing; petiole 40 cm long, rounded abaxially; rachis to 70 cm long, angled adaxially, rounded abaxially; pinnae 12–17 on each side of the rachis, middle ones largest, to 30 × 4 cm, apical ones 10 × 1.5 cm, basal ones to 20 × 1–2 cm, long lanceolate to linear, straight but lower margin falcate, long-acuminate, strongly contracted basally to 5 mm wide, widest in the middle, shining green, drying plicate, slightly prominent midrib, 3–5 much less prominent primary nerves on each side of midrib, 1–2 secondaries between each primary, tertiaries numerous, faint.

Inflorescences (Fig. 9) 3–6 per plant, infrafoliar, breaking through persistent sheaths well below the leaves, ascending to spreading. Staminate with peduncle to 30 cm long, 1 cm wide at base and flattened, 3–4 mm diam. at apex, green in flower where exposed, bracts 6–7, prophyll 2 cm long, 2nd bract 2.5 cm, 3rd 4 cm, 4th 7 cm, 5th 15 cm, 6th 17 cm, 7th 14 cm and concealing 1–2 rudimentary bracts, 7th up to 3 cm long, all acute-acuminate, bifid, brown in flower, obliquely open apically, longitudinally striated, upper one not exceeding peduncle; rachis 10 cm long; rachillae 32, lower ones longest, to 15 cm long, becoming progressively shorter toward apex of rachis and there to 8 cm long, all slender, 1 mm diam., mostly simple but lower ones sometimes furcate or with 3 branches, longitudinally ridged, spreading to slightly drooping, undulating, greenish in flower. Pistillate with peduncle to 48 cm long, 1 cm wide at base and ±flattened, 2–4 mm diam. at apex, green and ascending in flower, orange-red and arching or downward-pointing in fruit where exposed; bracts as in staminate, becoming brownish and tattered in fruit; rachis to 10 cm long, green in flower, orange-red in fruit, lower portions of later inflorescences often with 3–9 lateral axes to 2–3 cm long, each axis containing 2–5 rachillae each; rachillae 8–40, lower ones longest, to 14 cm long, becoming progressively shorter toward apex of rachis and there to 6 cm long, all 1–1.5 mm diam., longitudinally ridged when dry (nearly winged), undulating, green and spreading in flower, orange-red and downward-pointing in fruit (Fig. 10).

Staminate flowers in moderate spirals 2–4 mm apart, 3 × 4 mm at anthesis, obovoid, yellowish, slightly sunken in elliptic depressions 1.5 × 0.75 mm; calyx 1.25 × 1.5–2 mm, deeply lobed, sepals imbricate in basal ¼–⅓, acute to truncate or rounded apically, brown-margined, not or only faintly nerved when dry; petals 3 × 2.5 mm, ovate, free nearly to the base, widely spreading, acute, cupped inward especially apically, lightly nerved when dry; stamens 2 mm high, just shorter than pistillode, filaments 1–1.5 mm long, 0.25 mm diam., anthers 1 mm long, oblong, dorsifixed toward base; pistillode 2.5 mm high, columnar, just shorter than petals. Pistillate flowers in rather lax spirals 3–9 mm apart, ±superficial, leaving oval to slightly elliptic scars 1–1.5 mm long; in fruit calyx 2.5 mm across, deeply lobed, sepals 1.25 × 1 mm, imbricate (and or briefly connate?) in basal ½, acute apically, brown-margined, very faintly nerved adaxially; corolla 4–5 mm across, deeply lobed, petals 3 × 2–3 mm, broadly ovate, imbricate in basal ½–⅔, broadly rounded to acute apically with a small "beak," faintly nerved abaxially, slightly more prominently nerved adaxially; pistil not seen. Fruits 8–10 × 6–8 mm, obovoid-globose, black; seeds 8 × 5 mm, ovoid to oval.

Distribution: GUATEMALA. MEXICO. Moist or wet montane rain forest and cloud forest on the Pacific slope; 1,500–2,500 m elevation.

Specimens Examined: GUATEMALA. Quetzaltenango: southwest slope of Volcan Zunil, *Hodel & Castillo 911* (holotype BH, isotype AGUAT), *988* (AGUAT, BH), *Skutch 926* (GH). Sacatepequez: east of Antigua, *Castillo 1247* (AGUAT, BH), *Harmon 2367* (MO). Solola: SW slope of Volcan Atitlan, *Steyermark 47411* (F). Suchitepequez: south side of Volcan Ati-

tlan, *Skutch 1535* (GH). MEXICO. Chiapas: Escuintla, Mt. Ovando, *Matuda 18281* (MEXU); Angel Albino Corzo, NE slope of Cerro Venado above Finca Cuxtepec, *Breedlove & Bourell 67615* (CAS); Cintalapa, Cerro Baul, 16 km NW of Rizo de Oro, *Breedlove 24928*, *Breedlove & Smith 21381* (CAS).

The specific epithet honors Audrey and Philip Keeler of Santa Ana, California, who have encouraged and supported Hodel's work in *Chamaedorea* for several years and, in particular, supported our field work in Guatemala on numerous occasions.

The Guatemalan specimens cited here as *C. keeleriorum* along with descriptions and dimensions of their various parts were tentatively included in *C. whitelockiana* and illustrated as such in the monograph of *Chamaedorea* (Hodel 1992, p. 218 and plate 95, p. 235). The inclusion of the Guatemalan material in that treatment significantly increased the size of the habit, stem, and leaves, and size and number of pinnae and rachillae over those contained in the original description of *C. whitelockiana* (Hodel and Uhl 1990). However, in the 1992 account I alluded to the possibility that the Guatemalan material may represent a new unnamed species; new information has confirmed this possibility, enabling us to describe and name *C. keeleriorum*.

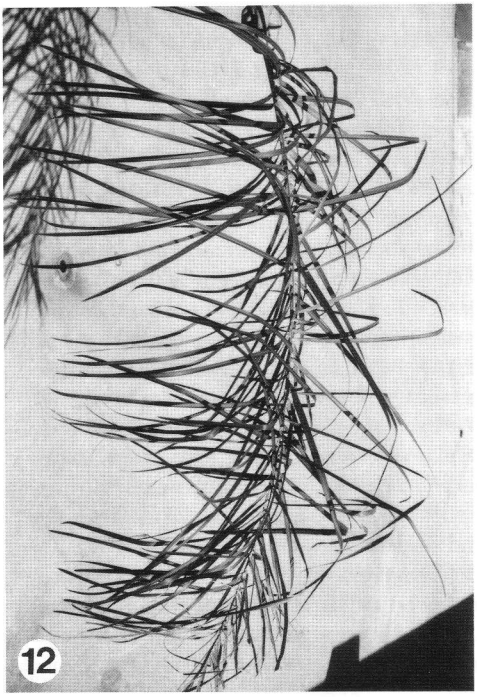
Although close to *C. keeleriorum*, *C. whitelockiana* differs in its smaller habit, stem, and leaves; smaller and fewer pinnae and rachillae; and the only shallowly lobed staminate calyx. *C. keeleriorum* would key out next to *C. whitelockiana* in the key to the species of subgenus *Chamaedoropsis* (Hodel 1992).

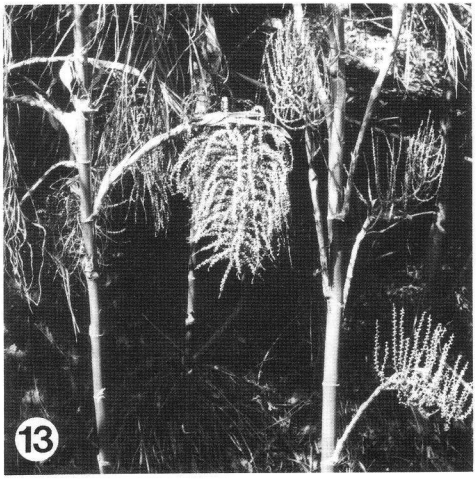
In the initial flowerings, the pistillate inflorescence of *C. keeleriorum* has simple rachillae originating from an unbranched rachis. However, with subsequent flowerings, the basal portion of the rachis becomes branched with several axes, each axis containing up to five rachillae. In Guatemala, *C. keeleriorum* grows with *C. fractiflexa*, *C. pachecoana*, *C. rojasiana*, and *C. volcanensis* among others. *C. keeleriorum* is not known to occur in cultivation.

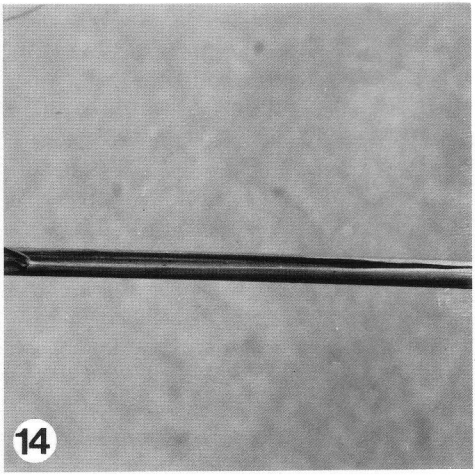
Chamaedorea plumosa D. R. Hodel **sp. nov.** (Figs. 11–19).

Subgeneris *Chamaedoropsi* Oerst. inflorescentiis masculis solitariis, floribus masculis solitariis petalis patentibus apicaliter. *C. woodsonianae* L. H. Bailey et *C. carchensi* Standl. & Steyerm. affinis sed pinnis numerosioribus (ca. 100 versus 36 et 20) longilinearibus maxime graminiformibus exorientibus rhachibus planis et cursibus diversis differt. *C. glaucifoliae* H. A. Wendl. habitu affinis sed subgenere diverso sine indumentio glauco differt. Typus: Cult., *Hodel 1141* (holotypus BH; isotypi AGUAT, CAS, CR, F, HNT, K, MEXU, MO, NY).

Solitary, to 5 m or more tall (Fig. 11), erect, ±robust. Stem 4–6.5 cm diam., smooth, green, ringed, internodes 10–23 cm long. Leaves 7–9, pinnate, erect-spreading, plumose (Fig. 12), dull ±grayish green; sheath to 50 cm long, persistent, obliquely open in apical ¼, tubular and tightly clasping in basal ¾, densely longitudinally striated with a raised central costa extending from petiole; petiole 20–30 cm long, 1 cm diam., oval in x-section, deeply but narrowly channelled adaxially (Fig. 14), the channel extending beyond the first basal pinnae, green, lacking yellow band abaxially, longitudinally striated laterally; rachis to 110 cm long, green and angled adaxially, green and rounded abaxially; pinnae to 85 per side, basal ones longest, these to 54 × 0.6–1.4 cm, pinnae in apical ¼ of blade-tapering to 25 cm long, long-linear, straight, long-acuminate, aggregated in irregular groups along rachis, exiting rachis in several planes and directions (Fig. 12), mostly ascending and spreading but some downward-, foreward-, or backward-pointing to give blade plumose appearance, a hard whitish bump at point of attachment adaxially, a prominent







11. Group planting of *Chamaedorea plumosa* in garden of Rae Anderson, Sierra Madre, California. 12. Plumose leaf of *Chamaedorea plumosa* with pinnae exiting rachis in several planes and directions, *Hodel 1141* (holotype). 13. *Chamaedorea plumosa*, inflorescences on staminate plant (left), *Hodel 1141* (holotype), and pistillate plant (right), *Hodel 1142*, garden of Rae Anderson, Sierra Madre, California. 14. Deeply channeled petiole of *Chamaedorea plumosa* is characteristic of the species.

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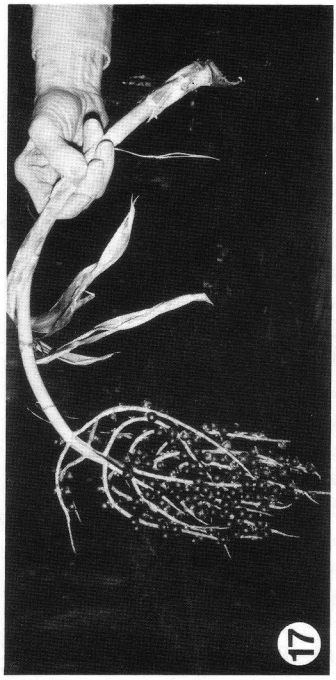
15. Staminate inflorescence of *Chamaedorea plumosa*, *Hodel 1141* (holotype). 16. Pistillate inflorescence of *Chamaedorea plumosa*, *Hodel 1142*. Note stiff, erect rachillae. 17. Infructescence of *Chamaedorea plumosa*, *Hodel 1142*. 18. Staminate flowers of *Chamaedorea plumosa*, *Hodel 1141* (holotype). 19. Pistillate flowers of *Chamaedorea plumosa*, *Hodel 1142*.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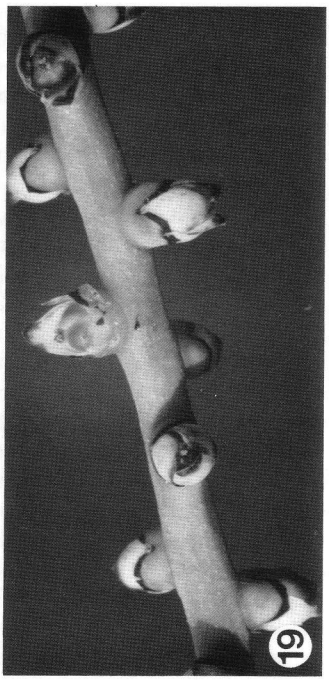
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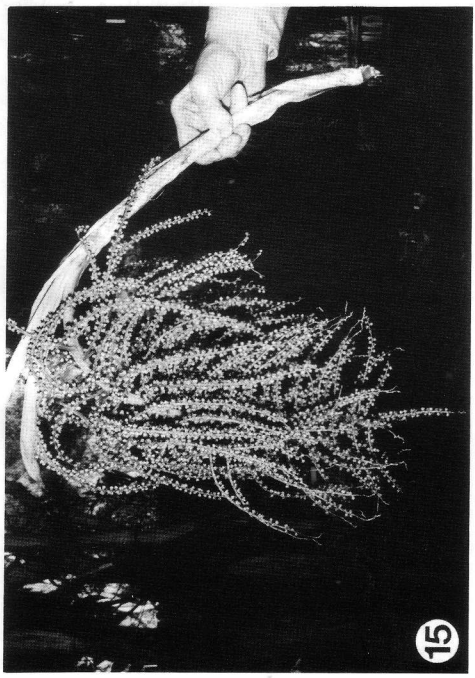
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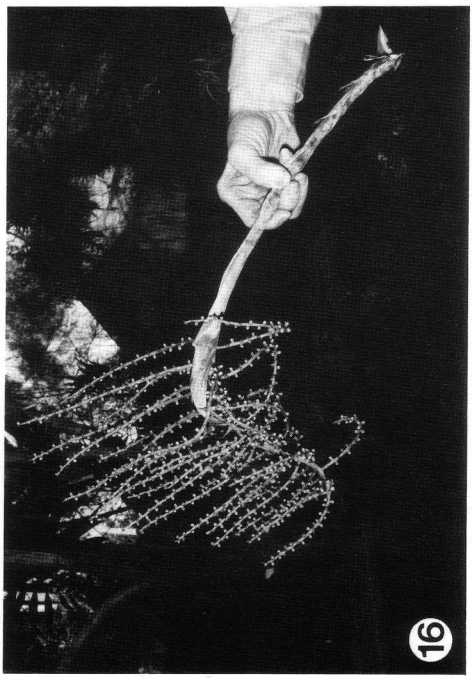
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midrib raised adaxially and abaxially, 1–3 much less prominent lateral nerves on each side of midrib adaxially and abaxially.

Inflorescences 6 per plant (Fig. 13), infrafoliar, emerging through old persistent sheaths, erect-spreading. Staminate (Fig. 15) with peduncle to 54 cm long, 2–2.5 cm wide at base and there flattened, 1–1.5 cm diam. at apex and oval in x-section, ascending, green in flower where exposed; bracts 8–9, prophyll 5.5 cm long, 2nd bract 14 cm, 3rd 22 cm, 4th 23 cm, 5th 28 cm, 6th 31 cm, 7th 35 cm, 8th 30 cm, 9th 6 cm and concealed by 8th, bracts brown and dried in flower, acute-acuminate, bifid, not too tightly sheathing, upper one extending well beyond peduncle and onto rachis, longitudinally striate-nerved; rachis to 32 cm long, green and downward-pointing; rachillae ca. 100, lower ones longest, these to 30 cm long, apical ones to 10 cm long, spreading to slightly drooping, green, mostly simple, few of lower ones furcate. Pistillate (Fig. 16) with peduncle to 50 cm long, 1–2 cm wide at base and flattened, 5–8 mm diam. at apex and rounded, ascending, green in flower and orange in fruit where exposed; bracts as in staminate inflorescence; rachis to 32 cm long, green and s-downward-pointing in flower, orange and straight downward-pointing in fruit; rachillae 30–45, lower ones longest, these to 22 cm long, apical ones 8–10 cm long, green and erect in flower, downward-pointing and orange in fruit.

Staminate flowers (Fig. 18) in moderate spirals 2–3 mm apart, 4.5–5 × 4–5 mm at anthesis, ±globose to obovoid, yellow aging with brown tips and margins, slightly sunken in elliptic depressions 3 × 2 mm; calyx cupular, 2 × 3 mm, green with brown margins, sepals connate in basal ½, broadly rounded to truncate and thin apically; petals 4.5–5 × 3 mm, long-ovate, free nearly to base, spreading apically, acute, slightly recurved, thick, fleshy, rounded and faint ridges adaxially, margins thickened, rounded or revolute; stamens 2–2.5 mm high, ½ as high as petals and in tight ring around pistillode, filaments 1.5 × 0.3–0.4 mm, connate basally in ring and there adnate to pistillode, clear-colored, anthers 1 mm long, bilobed, dorsifixed, brownish; pistillode 3–3.5 × 1 mm, broadly columnar, exceeding stamens but shorter than petals, yellow. Pistillate flowers (Fig. 19) in lax spirals 5–8 mm apart, 5 × 3.5 mm, ±ovoid, yellow aging with brown tips, slightly sunken in rounded to elliptic depressions 3 × 2.5 mm; calyx cupular, 2.5 × 3.5 mm, green, sepals connate in basal ⅓, broadly rounded to truncate apically; petals 5 × 3.5–5 mm broadly triangular, tightly imbricate in basal ⅔, acute and slightly recurved apically, fleshy, lateral margins thin, membranous; staminodes 0.8 mm high, toothlike, clear-colored; pistil 3 × 2.5–3 mm, ±globose, 3-lobed, green, stigma lobes short, recurved, separated, clear-colored. Fruits (Fig. 17) 11 × 11 mm, ±globose, black, petals brown in fruit, triangular, to 4 mm long, sepals orange basally in fruit, browning apically and there rounded, to 2.5 mm long.

Distribution: MEXICO. Chiapas. Evergreen seasonal forest of the central depression and plateau; 600–1,200 m elev.; often on limestone.

Specimens Examined: MEXICO. Chiapas: Teran, 4 km N of Juan Crispin along road to San Fernando, *Breedlove & Thorne 30366* (CAS). CULTIVATION. Mexico. Chiapas: Las Rosas, along streets and in yards, *Breedlove & McClintock 23699* (CAS). U.S.A. California: Los Angeles County, Sierra Madre, garden of Rae Anderson, *Hodel 1141* (holotype BH; isotypes AGUAT, CAS, CR, F, HNT, K, MEXU, MO, NY), *1142* (BH, MEXU). Brazil. Rio de Janeiro: Rio Botanical Garden?, *Glaziou 2146* (BR, photo).

Chamaedorea plumosa is quite distinct in its numerous, narrow pinnae arising from the rachis in different planes and directions and giving the leaves a plumose appearance; hence the specific epithet *plumosa*.

In fact, the leaf is not too unlike that of the commonly cultivated *Syagrus romanzoffiana*. Only *C. glaucifolia* and some forms of *C. graminifolia* have numerous, narrow pinnae similar to those of *C. plumosa*. However, the former two species are in a different subgenus (subgenus *Chamaedorea*) and are amply distinct florally, having staminate flowers with the petals connate apically and there adnate to the pistillode and the corolla opening by lateral slits. Also, *C. plumosa* lacks the glaucous indument of *C. glaucifolia* and the cespitose habit of *C. graminifolia*. Neither of the latter two species has pinnae arising from the rachis in the same fashion as those of *C. plumosa*.

Chamaedorea plumosa is actually closest to *C. carchensis*, *C. keeleriorum*, and *C. woodsoniana* but differs dramatically in its numerous, narrow pinnae exiting the rachis in different planes and directions. *C. plumosa* would key out next to *C. woodsoniana* in the key to the species of subgenus *Chamaedoropsis* and next to *C. glaucifolia* in the key to the cultivated species of *Chamaedorea* in Hodel (1992).

Gary Hammer, a plant collector and grower in Los Angeles, introduced *C. plumosa* in the late 1980s. He collected seeds from cultivated plants in Las Rosas, Chiapas but did not see the species in the wild. Local people in Las Rosas told him that the cultivated plants came from a large canyon behind the village. Although I saw immature plants in 1987 that Hammer offered for sale, I assumed they were simply a robust form of *C. glaucifolia*. It was not until February, 1992, that I determined that *C. plumosa* was distinct upon collecting excellent flowering and fruiting material in the garden of Rae Anderson of Sierra Madre, California.

Chamaedorea plumosa is a vigorous, fast-growing, robust plant that appears to have excellent horticultural potential. Rae Anderson has reported that his plants, after only three years in the ground, are more than five meters tall to the tip of the highest leaf and produce six leaves and inflorescences per tree per year. The trunks are now about three meters tall (about a meter of trunk per year once established). The plants tolerate full, hot sun during the middle of the day from 10 AM to 2 PM and withstood sub-freezing temperatures [−10° C (24° F)] with little or no damage in December, 1990.

Miscellaneous Notes

Chamaedorea elegans. *C. elegans*, a highly variable and widely distributed species, has been extensively collected throughout Mexico and Guatemala but, until recently, only on the Atlantic slope. In 1989, I collected several unidentified, pinnate-leaved, juvenile plants of *Chamaedorea* at 1,400 m elevation in oak-pine cloud forest on the Pacific slope of Oaxaca, Mexico. These plants were reestablished in the research collection in Los Angeles and they flowered in 1991. Much to my surprise, an examination of the flowers showed them to be identical with those of *C. elegans*.

It is not unusual for species of *Chamaedorea* to occur on both the Atlantic and Pacific slopes, even in Mexico where the geographic barriers and distances between the two are great. However, it is noteworthy for such a well known and widespread species to escape detection on the Pacific slope until recently. This only recent discovery indicates that the disjunct populations of *C. elegans* on the Pacific slope are isolated and highly localized and/or points out the paucity of collecting in this region. Herbarium specimens, *Hodel 1139* (pistillate) and *1140* (staminate), and flowers preserved in FAA were made from the cultivated material from the Pacific slope of Mexico and deposited at the Bailey Hortorium (BH).

Hybrid in Cultivation. Ingwersen Nursery of Oceanside, California has recently released a new hybrid of *Chamaedorea* with multiple stems. The name given

to the hybrid here is that used by the nursery.

Chamaedorea Hal Moore (*C. hooperiana* × *C. pochutlensis*). Named for the late Harold E. Moore, Jr., this hybrid is a fast and vigorous grower and combines characters of both parents. Ingwersen Nursery had made and marketed another hybrid, *Chamaedorea* Horace Anderson (Hodel 1992), using the same two species as parents as were used for *Chamaedorea* Hal Moore. However, the two hybrids differ slightly since different forms of the highly variable *C. pochutlensis* were used in each hybrid.

Acknowledgments

I thank Dennis Breedlove of the California Academy of Sciences and Gary Hammer of Los Angeles who provided additional information about collection localities in Chiapas, Mexico. Rae Anderson of Sierra Madre and Paul Baylard of Ingwersen Nursery permitted me to collect material at their garden and nursery respectively. I also thank the curators of BH, CAS, F, GH, HNT, and MEXU who lent and/or provided facilities and specimens for study.

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