

## The Cultivated Species of *Chamaedorea* with Cespitose Habit and Pinnate Leaves

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The cultivated *Chamaedorea* with cespitose habit (multiple or clustered stems) and pinnate leaves are among the most handsome, useful, and widely grown species of the genus. They are found in four of the eight subgenera that comprise *Chamaedorea*. This paper features those in subgenus *Chamaedoropsis* since they are widely cultivated but often misidentified. In addition, a name for a new species with cespitose habit and pinnate leaves, but in subgenus *Chamaedorea*, is proposed here since the new species is very similar in habit to and easily confused with those species in subgenus *Chamaedoropsis*. A combination of characters, including solitary inflorescences, solitary, regularly spaced staminate flowers with apically free petals, and black fruits, distinguish subgenus *Chamaedoropsis* from other subgenera in *Chamaedorea*. Staminate flowers with the petals connate apically and there adnate to the pistillode and the corolla opening by lateral apertures distinguish subgenus *Chamaedorea*.

There are other cultivated species with cespitose habit and pinnate leaves but I touch on these other species only briefly though, since they have vegetative characters that readily distinguish them from those species featured here. In addition, several of the other species are in different subgenera and thus also differ substantially in their flowers. These other species include *C. microspadix*, *C. cataractarum*, and some forms of *C. elatior* and *C. tepejilote*. Another *Chamaedorea* with cespitose habit and pinnate leaves, *C. graminifolia*, is not

cultivated, at least in its pure form. Cespitose stems spreading by rhizomes and forming loose clusters with finely textured leaves, numerous, narrowly linear, straight pinnae, and a glaucous covering on the stem and apical portion of the leaf sheath distinguish *C. graminifolia*. *C. schippii* is a synonym of *C. graminifolia* and growers and collectors frequently but erroneously apply the name *C. schippii* in cultivation to material of a hybrid between *C. graminifolia* and *C. pochutlensis*.

*Chamaedorea graminifolia*, like the new species proposed here and the highly variable *C. elatior*, is in subgenus *Chamaedorea*; thus, it has staminate flowers with the petals connate apically and the corolla opening by lateral apertures. *C. elatior* is very distinctive due to its vining, climbing habit and strongly reflexed, hooklike terminal pinnae. Actually, solitary-stemmed forms of *C. elatior* are more common but occasionally one encounters cespitose forms. In addition to shoots originating from the base of the plant, new branches on the cespitose forms of *C. elatior* may arise a meter or more above the ground.

Staminate flowers clustered in groups and with free, apically spreading petals and red fruits easily distinguish *C. microspadix*. I discussed *C. cataractarum* and *C. tepejilote*, members of subgenus *Stephanostachys*, in an earlier paper (Hodel 1990). Densely packed staminate flowers contiguous even in bud set subgenus *Stephanostachys* well apart from subgenus *Chamaedoropsis*. Other distinguishing

characters of *C. cataractarum* and *C. tepejilote* include the acaulescent habit with creeping, dichotomously branched stems of the former and the pinnae of the latter that dry leaving keeled, shining yellow, prominent nerves. Like *C. elatior*, there are solitary-stemmed or cespitose forms of *C. tepejilote*.

Here I provide a key to all the cultivated species of *Chamaedorea* with cespitose habit and pinnate leaves although I discuss only those in subgenus *Chamaedoropsis* and the newly named species in subgenus *Chamaedorea*. I include *C. graminifolia* in the key even though it is not cultivated since a synonym, *C. schippii*, is of common usage in horticulture and the hybrids existing between *C. graminifolia* and *C. pochutlensis* are often the source of confusion. Expanded descriptions of all taxa will appear in my forthcoming treatment of *Chamaedorea* that the International Palm Society will publish in 1991.

### Key to the Cultivated Species of *Chamaedorea* with Cespitose Habit and Pinnate Leaves

1. Plants appearing acaulescent but with very short, creeping, dichotomously branched stems; pinnae briefly decurrent on rachis. .... *C. cataractarum*
1. Plants with visible, elongated stems not dichotomously branched or creeping; pinnae not decurrent. .... 2
2. Plants climbing, vinelike; terminal pinnae reflexed, hooklike. .... *C. elatior*
2. Plants with erect or leaning stems, not climbing or vinelike; terminal pinnae forward-pointing. .... 3
3. Fruits red; staminate flowers greenish, clustered in groups of 3-4. .... *C. microspadix*
3. Fruits black; staminate flowers yellowish, not clustered in groups. .... 4
4. Pinnae with 5-12 primary nerves above; staminate flowers contiguous in bud. .... *C. tepejilote*
4. Pinnae with dominant midrib and 1-2 less prominent nerves on each side of this above; staminate flowers solitary. .... 5
5. Leaves with less than 16 pinnae on each side of rachis. .... *C. seifrizii*

5. Leaves with 20 or more pinnae on each side of rachis. .... 6
6. Apex of leaf sheath with ligules. .... 7
6. Apex of leaf sheath lacking ligules. .... 8
7. Ligules long-lanceolate, to 5 cm long or more, brownish and fibrous. .... *C. quezalteca*
7. Ligules short, triangular, less than 2 cm long, green with only a brown margin. .... *C. costaricana*
8. Pinnae narrowly linear; stems widespreading by rhizomes, forming loose colonies. .... *C. graminifolia*
8. Pinnae lanceolate; stems tightly clustering. .... 9
9. Leaf sheaths fibrous, grayish, persistent near top of stem, new shoots emerging from bases of bare stems; petals of staminate flowers spreading apically. .... *C. pochutlensis*
8. Leaf sheaths thick, durable, ± woody, brown, persistent throughout stem, new shoots emerging from tops of basal sheaths; petals of staminate flowers connate apically. .... *C. hooperiana*

### *Chamaedorea costaricana* Oerst.,

Vidensk. Meddel. Dansk. Naturhist. Foren. Kjoebenhavn 1858: 19, 1859 ("costaricanas"). Type: Costa Rica, Turrialba, Oersted 6543 (holotype C).

*Nunnezharia costaricana* (Oerst.) O. Kuntze, Revisio Generum Plantarum 2: 730, 1891.

*Chamaedorea biolleyi* Guillaum., Bull. Mus. Hist. Nat. (Paris) 28: 543, 1922. Type: Cult., *Biolley s. n* (holotype P).

*Chamaedorea linearia* L. H. Bailey, Genes Herb. 6: 249, Fig. 131, 1943. Type: Panamá, El Boquete, Pittier 2922 (holotype US).

*Chamaedorea seibertii* L. H. Bailey, Genes Herb. 6: 238, 1943. Type: Panamá, Chiriquí, Seibert 218 (holotype MO).

*Omanthe costaricana* O. F. Cook, Science 90: 298-299, 1939, name of no botanical standing.

Stems 3-8(15) m tall (Figs. 1-3), 2-8 cm diam., erect but often leaning with age on adjacent vegetation, internodes 5-40 cm long, forming fairly dense or ± open clumps several meters across. Leaves 4-7, 1-2 m long; sheath 20-60 cm long or more with a ligule on each side of petiole at apex, these initially lanceolate and mem-



1. A large clump of *Chamaedorea costaricana* grows in a ravine near Monteverde, Costa Rica, *D. & M. Hodel* 693. 2. This handsome clump of *Chamaedorea costaricana* is in the San Diego Zoo, California. 3. The main stems of *Chamaedorea costaricana* have short, horizontal, lateral stems at the base from which the new side shoots arise.

branous and later deciduous or rotting away to leave a triangular base 1–2 cm long (Fig. 4); petiole to 35 cm long; rachis to 100 cm long with a pale band extending onto sheath; pinnae 20–27 on each side of rachis, 25–60 × 2.5–4 cm, long linear-lanceolate to lanceolate, slightly sigmoid or ± straight and slightly falcate, a whitish midrib prominent above with 2 prominent primary nerves on each side of this. Inflorescences infrafoliar (Fig. 5), 30–60 cm long; peduncles 20–50 cm long; rachises 10–30 cm long; staminate with 15–50 rachillae, these 20–30 cm long, ± pendulous or drooping; pistillate with 10–30 rachillae, these 20–35 cm long, red-orange in fruit. Fruits globose, black, 6–10 mm diam.

*Distribution:* PANAMA. COSTA RICA. NICARAGUA. HONDURAS. Dense, moist to wet forest on both the Atlantic and Pacific slopes, 700–2,000 m elevation.

*Specimens Examined:* PANAMÁ. Coclé: El Valle, *D. & M. Hodel* 747 (BH, PMA). Veraguas: Bajo Chitra, *de Nevers & McPherson* 6793 (MO); S. Azuero Peninsula, *Hammel* 5374 (MO). Herrera: Las Minas, Chepo, *McPherson* 10938 (MO); Cerro Alto Higo, *Hammel* 4038 (MO). Los Santos: Río Pedregal, *Lewis et al.* 2927 (BH). Bocas del Toro: Cerro Bonyic, *Kirkbride & Duke* 604 (MO). Chiriquí: no specific locality, *Wagner* 476 (GOET); Volcán de Chiriquí, *Seibert* 218 (holotype of *C. seibertii*, MO); *Woodson & Schery* 502 (MO); *Woodson et al.* 948 (MO); *Hammel*

1565 (MO); Cerro Punta, *D. & M. Hodel* 732, 736A, 736B (BH, PMA); *Folsom et al.* 2080 (MO); *Hammel* 1528 (MO); *Croat* 26272 (MO); Cerro Pate Macho, *de Nevers & Charnley* 6688 (MO); Volcán Barú, *de Nevers & Charnley* 5995 (MO); Boquete, *Pittier* 2922 (holotype of *C. linearia*, US); *D. & M. Hodel* 731A, 731B (BH, PMA); *de Nevers & McPherson* 6809; Cerro Pelota, *Knapp* 1492, 1514 (MO); Cerro Horqueta, *C. & W. von Hagen* 2100 (MO); Planes de Chiriquí, *Croat* 48840 (MO); Los Llanos, *McPherson* 9261 (MO). COSTA RICA. Cartago: Turrialba, *Oersted* 6543 (holotype C); *Wendland* 24 (GOET); Río Pacuare, *Hodel & Grayum* 978 (BH, CR); Tapantí, *Hodel & Grayum* 698A, 698B (BH, CR); San José: Quebrado Tablazo, *Grayum & Schatz* 5138 (MO); above San Isidro, *Moore & McAlpin* 10151 (BH). Heredia: Volcán Barva, *Burger & Burger* 7687 (F). Puntarenas: Río Cotón, *Davidse* 24478 (MO); Sabalito, *Moore & Parthasarathy* 9436, 9437 (BH); hills above Palmar Norte, *Moore* 6549 (BH); Río Buru, *Gómez et al.* 21564, 21565, 21566 (MO); Monteverde, *D. & M. Hodel* 693A, 693B (BH, CR); *Moore* 10182 (BH); *Hammel & Haber* 13942 (MO); *Hammel & Trainer* 13810 (MO); *Haber & Bello* 6026, 5966 (MO). Guanacaste: Quebrada Zopilote, *Grayum et al.* 6214 (MO); Guayabo de Bagaces, *Gómez et al.* 24515 (MO); Rincón de la Vieja, *Garwood et al.* 680 (F, BM); Volcán Miravalles, *Burger* 9110 (F). Alajuela: Zarcero, *Croat* 24515 (MO); Santa María National Park, *Liesner* 4758 (MO). NICARAGUA. Chontales: Santo Domingo, *Bunting & Licht* 1194 (F). Granada: Volcán Mombacho, *Baker* 195 (RSA, CAS). Matagalpa: Santa María de Ostuma, *Williams et al.* 29201, 27673 (F); Cerro Picacho, *Williams et al.* 29201 (F); El Arenal, *Molina* 31600 (F). Jinotega: Jinotega, *Bunting & Licht* 966 (F). Madriz: S. Somoto, *Williams & Molina* 20275 (F). HONDURAS. El Paraíso: Volcanitos, *Pastor* 102 (UNAH). Ocote-

peque: San Marcos, *Nelson* 7985 (UNAH). CULTIVATED. Costa Rica: Puntarenas, San Vito, Jardín Botánico Robert y Catherine Wilson, *D. & M. Hodel* 709A, 709B (BH), originally from Las Alturas de Cotón; *D. & M. Hodel* 710A, 710B (BH), originally from Volcán Barva; Turrialba, C.A.T.I.E., *Croat* 575 (MO); San Jose, Ciudad Colón Hacienda Universidad Para La Paz, *Zamora & Chavarria* 1515 (MO). United States: Florida, Fairchild Tropical Garden 3017A, *Read* 1492 (BH). France: Paris, *Biolley s. n.* (holotype of *C. biolleyi*, P).

Oersted described and named *C. costaricana* from material he collected in mountain forests about 1,000–1,500 meters elevation near Turrialba, Costa Rica during his travels in Central America in the middle of the 19th century. Today, the native forest in this area is virtually gone, having been destroyed long ago for agricultural purposes. A few stands of *C. costaricana* still exist near the type locality, though, not far from Turrialba in forest remnants on the slope of Volcán Barva.

*Chamaedorea costaricana* is a most variable species throughout its rather wide range. Different species have been proposed based principally on size and number of parts and prominence of nerves of the pinnae. I have examined the type of *C. costaricana* and those of the other species I include in synonymy here; I can find no good differences to distinguish them.

Generally, there seems to be a relationship between altitude and rainfall and size of plants. It seems that smaller forms occur in lower altitudes with lower and perhaps more seasonal rainfall while larger forms occur at higher altitudes where rainfall is greater and less seasonal and evaporation less. Bailey's *C. linearia* is near the large end of the spectrum with plants being larger in every part. At the small end is Bailey's *C. seibertii*. The typical *C. costaricana* that Oersted described represents the middle of the spectrum. In a few instances at high or wet locations, such as Cerro Punta



in Panamá and Tapantí in Costa Rica, *C. costaricana* attains rather large size. At Cerro Punta, we collected material with stems to 15 meters in height and nearly 8 cm diam. Botanists and horticulturists have confused these large forms of *C. costaricana* with *C. woodsoniana*. The solitary habit with even more robust stems, lack of persistent ligules at the apex of the leaf sheath, heavily nerved, straight pinnae, larger inflorescences with longer peduncles, and elongated fruits distinguish *C. woodsoniana*.

The presence of the two ligules at the apex of the leaf sheath is a diagnostic character unifying these forms. These appendages are lanceolate and membranous and more or less deciduous, at least in their upper portion. The lower or basal portion is not as membranous and is often persistent as a triangular tooth or auricle (Fig. 4) long after the upper portion has fallen or rotted away. Since the upper portion is membranous and rots away rather rapidly, the overall visibility of this appendage is much reduced with time. Therefore, it is best viewed on leaf sheaths on the apical portions of stems near new, emerging leaves.

*Chamaedorea costaricana* has been cultivated for ornament in San José, Costa Rica at least since the late 1800s and probably earlier, the forested slopes of Volcán Barva serving as a ready and accessible source of plants and seeds. Today, handsome clumps are found throughout the city. It is also commonly found in towns and villages to the north of San José along National Route 9 that winds past Volcán Barva to the Atlantic lowlands. Here, such as at the towns of Heredia and Barva, it is seen as a large hedge, screen, or single specimens in many of the yards and residences. From Costa Rica, it has spread throughout the horticultural world and is one of the more widespread members of the genus in cultivation, being found in gardens and collections in California, Florida, Hawaii, Australia, and elsewhere.

Surprisingly, much, if not most, of the material in California cultivated as *C. costaricana* is actually *C. pochutlensis*. In addition, material in California and Hawaii grown as *C. woodsoniana* is actually *C. costaricana*.

**Chamaedorea hooperiana** D. R. Hodel  
**sp. nov.** (Figs. 6–8).

Subgenus *Chamaedoreae* Mart. ex H. A. Wendl. inflorescentiis masculis solitariis, floribus masculis solitariis petalis connatis apicaliter corollis aperturis lateralibus. *C. graminifoliae* H. A. Wendl. et *C. pochutlensi* Liebm. affinis sed surculis basilibus propullanibus erectis post vaginas infuscatas persistentes crassas induratas subligneas, foliis crassis induratas differt. Typus: Cult., D. R. Hodel 772 (holotypus BH; isotypi CR, HNT, K, MEXU, MO, NY).

Cespitose, new lateral shoots emerging from tops of old dried persistent basal sheaths (Fig. 8), forming fairly dense clumps to 3–4 m across, erect, leaning with age, to 4–5 m tall, stems 2–2.5 cm diam., green, ringed, often covered with old leaf bases, internodes to 15 cm long. Leaves 5–7, erect-spreading, pinnate; sheath to 40–50 cm long, tightly clasping, obliquely open apically and there splitting deeply opposite petiole with age, rough-brown-margined, below this whitish and longitudinally striate-nerved, old sheaths persistent, drying brown, hard, durable, ± woody; petiole to 20–35 cm long, lime-green and grooved especially near the base adaxially, rounded and pale abaxially; rachis to 0.8–1 m long, lime-green and sharply angled adaxially, rounded abaxially with a green or yellowish band extending onto sheath, attenuate apically; 20–26 pinnae on each side of rachis (Fig. 7), these regularly arranged, opposite to subopposite, flat off rachis, elongate-lanceolate, lower and middle ones longest, these to 40 × 1.8 cm, becoming progressively shorter toward apex of rachis,



4. The short ligule at the apex of the leaf sheath is a diagnostic feature of *Chamaedorea costaricana*. Compare it with that of *Chamaedorea quezalteca* in Figure 12. 5. The infructescence of *Chamaedorea costaricana* is held below the leaves. 6. A large clump of *Chamaedorea hooperiana* grows at Ingwersen Nursery in Oceanside, California. 7. Leaf and pistillate inflorescence of *Chamaedorea hooperiana* were taken from a plant cultivated in the garden of P. Sullivan in Ventura, California, Hodel 804.

± straight, only slightly falcate, long-acuminate, slightly contracted at base, ± thick, durable, a prominent pale midrib sharply angled adaxially and 2 much less prominent primary nerves on each side of this, secondaries and tertiaries faint and inconspicuous, midrib prominent abaxially, apical pair of pinnae slightly wider.

Inflorescences infrafoliar, emerging from tops of dried persistent sheaths, erect. Sta-

minate with peduncle to 30 cm long, 1.5 cm wide at base, erect-spreading, pale green where exposed; bracts 5-6, tubular, tightly sheathing, obliquely open apically and there bifid except largest which is long-acuminate and greatly exceeds peduncle and often conceals 1 or 2 smaller ones, longitudinally striate-nerved, drying brown at anthesis; rachis 20 cm long, light green; 40-45 rachillae, these to 25 cm long,

spreading-drooping, light green, 1.75–2 mm diam. Pistillate (Fig. 7) with peduncle to 50 cm long, 1.5 cm wide at base, erect, pale or greenish in flower where exposed, reddish orange in fruit; bracts 6, similar to those of staminate inflorescence, brown and persistent in fruit; rachis to 22 cm long, green-yellow at anthesis, reddish orange in fruit; 40 rachillae, lower ones longest, these to 22 cm long, apical ones to 10 cm long, spreading slightly,  $\pm$  stiff, yellow-green at anthesis, reddish orange in fruit.

Staminate flowers spirally arranged, 3–3.5 mm distant, subglobose, 3–3.5  $\times$  3–4 mm, highly aromatic, slightly sunken in elliptic depressions; calyx cupular, 1  $\times$  2 mm, membranous, light green, shallowly 3-lobed, lobes broadly rounded, sepals connate nearly to top; petals valvate, connate apically and there adnate to pistillode and corolla opening by lateral slits, petals later apically spreading slightly? but remaining inwardly curved, yellow, 3.5  $\times$  3 mm, broadly acute, reflexed only slightly at tip, margins  $\pm$  thickened; stamens 2.5 mm tall, filaments 1–1.5 mm long, very pale green, nearly clear-colored, anthers 1 mm long, yellow changing to white; pistillode columnar, 2.75 mm tall, light green, darkened and narrowed apically. Pistillate flowers in rather remote spirals, 8 mm distant, globose, 3  $\times$  3 mm, slightly immersed in elliptic depressions; calyx very light green or nearly yellow, 1–1.5  $\times$  3 mm, prominently 3-lobed, lobes broadly rounded, sepals connate and/or lightly imbricate basally; petals tightly imbricate, opening only briefly apically, light greenish yellow, 2.5–2.75  $\times$  3 mm, acute; pistil globose, light green, 3  $\times$  3 mm, styles lacking, stigma lobes distinct but low, rounded. Fruits black, oblong-globose, 7–8 mm diam.

*Distribution:* MÉXICO. Veracruz. Dense, wet forest, 1,000–1,500 m elevation.

*Specimens Examined:* MÉXICO. Veracruz: Catemaco, *D. & R. Hodel 922* (BH, MEXU); *Dressler & Jones 91* (GH).

**CULTIVATED.** California: La Habra, garden of Lou Hooper, *Hodel 772* (holotype BH; isotypes CR, HNT, K, MEXU, MO, NY); Ventura, garden of Pauleen Sullivan, *Hodel 804* (BH); San Marino, Huntington Botanical Gardens 43001, *Hodel 690* (BH).

The epithet honors Lou Hooper of La Habra, California in whose garden I collected the type specimen.

*Chamaedorea hooperiana* exists in only a few collections in southern California. Pauleen Sullivan in Ventura, Louis Hooper in La Habra, Jack Ingwersen in Oceanside (Fig. 6), and the Huntington Botanical Gardens in San Marino have mature plants in their gardens. For years these plants were unidentified and their origin uncertain. The common story was that the existing plants originated from one introduction by an unknown seaman who collected seeds in a port of call in Central American and brought them to Southern California.

In December, 1989, during field work in México, we found it in the wild in the Catemaco region of Veracruz, enabling us to provide a known locality for it. Sullivan has plants of both sexes and produces seeds regularly that she has distributed to local palm collectors and hobbyists. I originally thought that this species was *C. karwinskyana* and plants of *C. hooperiana* may have been distributed as such. However, I have since examined the type of *C. karwinskyana* and realize that it can be included with *C. pochutlensis*.

Similar florally to *C. graminifolia* and vegetatively to *C. pochutlensis*, *C. hooperiana* can be distinguished in the manner in which it sends forth new shoots from the base of the plant. These emerge from the tops of the persistent, nearly woody, basal leaf sheaths (Fig. 8). In addition, *C. hooperiana* has thicker, durable, nearly plasticlike leaves. Rhizomatous stems emerging some distance from the parent plant and soft, thin, narrowly linear pinnae also distinguish *C. graminifolia*. Other distinguishing characters of *C. pochutlensis*

include the staminate flowers with apically spreading petals and broader, softer pinnae.

A handsome species of easy culture, *C. hooperiana* is a vigorous and relatively fast grower. Its eventual size should be considered when placing it in the landscape. With age, it will form rather dense clumps several meters across. Stems toward the perimeter of the clump tend to lean outward gracefully, occupying even more space. It is more resistant to infestations of mites than *C. costaricana* and *C. pochutlensis* and is much superior as an indoor plant. In fact, it holds great promise for use in interior situations due to its tolerance of low light and low humidity and resistance to pests. Collectors in southern California have made hybrids between *C. hooperiana* and *C. pochutlensis*.

**Chamaedorea pochutlensis** Liebm. in Mart., *Historia Naturalis Palmarum* 3: 308, 1849. Type: México, Oaxaca, Liebmann 6579 (holotype C, isotype MO).

*Chamaedorea karwinskyana* H. A. Wendl., *Allg. Gartenzeitung* 21: 179, 1853b. Type: Cult., *Wendland s. n.* (holotype GOET).

*Nunnezharia pochutlensis* (Liebm. in Mart.) O. Kuntze, *Revisio Generum Plantarum* 2: 730, 1891.

*Nunnezharia karwinskyana* (H. A. Wendl.) O. Kuntze, *Revisio Generum Plantarum* 2: 730, 1891.

*Chamaedorea elatior* Hort. (non Mart.).

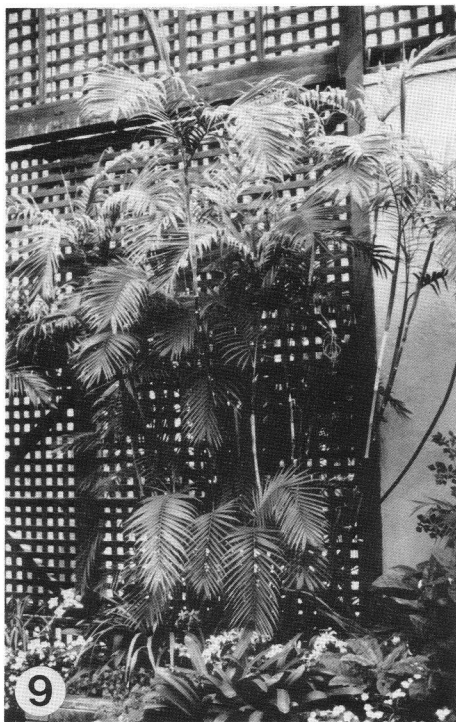
*Chamaedorea robusta* Hort.

Stems to 3–5 m tall or more (Figs. 9, 10), 2–3 cm diam., internodes 10–25 cm long, forming dense clumps eventually reaching 2–3 m across. Leaves 3–5, to 2 m long; sheath to 30 cm long, green but drying pale or whitish and persisting on stem; petiole to 30 cm long; rachis to 1 m long or more with a pale or light green band extending onto sheath, petiole and sheath  $\pm$  slightly glaucous; pinnae 20–33

on each side of rachis, regularly arranged, elongate-lanceolate, to 40  $\times$  2–3 cm, a prominent pale midrib and 2 submarginal primary nerves, secondaries and tertiaries inconspicuous. Inflorescences infrafoliar, erect-spreading; peduncles 30–40 cm long; rachises 10 cm long; staminate with 12–25 rachillae, these 15–20 cm long, slender  $\pm$  drooping, green; pistillate with 12–18 rachillae, these 15 cm long, slender, spreading and  $\pm$  stiff but becoming  $\pm$  drooping and reddish orange in fruit. Staminate flowers strongly aromatic. Fruits black with glaucous bloom, globose-ellipsoid, 12–13  $\times$  8–10 mm.

*Distribution:* MÉXICO. Moist forest on the Pacific slope, 50–2,000 m elevation.

*Specimens Examined:* MÉXICO. Oaxaca: inland from Puerto Ángel, Moore 8238 (BH); in hills behind Pochutla, Liebmann 6579 (holotype C, isotype MO); D. & R. Hodel 940 (BH, MEXU); in hills behind Puerto Escondido, D. & R. Hodel 934A, 934B (BH, MEXU). Guerrero: road from Acapulco to Acahuzotla, Moore 6202 (BH). Michoacán: near Atenga on road to Playa Azul, Moore 8789 (BH); near Uruapan, Moore et al. 5755 (BH); Apatzinga, Aguillilla, Hinton et al. 15984. Jalisco: Colima, Rancho El Jabali, Sanders et al. 8146 (RSA); Estación Biología Las Joyas. Cochrane & Judziewicz 10647 (RSA); road from Autlán to Barra de Navidad, Moore & Bunting 8743 (BH); Sierra de Parnaso, Boutin & Kinnach 3113 (HNT); Sierra de Manantlán, Cerro La Piedra Bola, Iltis & Guzman 29106, 29107 (WIS); La Manzanilla, McVaugh 25051 (MICH). Nayarit: road from Tepic to Jalcocotán, Moore & Bunting 8693 (BH); Boutin 2090 (HNT). Sinaloa: Sierra Tacuichamona, Capadero, Gentry 5605 (GH); Sierra Surotato, La Jolla, Gentry 7281 (RSA). Durango: below Los Molinos, Kinnach & Sanchez-Mejorada 1781 (HNT); El Palmito, Kinnach & Sanchez-Mejorada 1689 (HNT). CULTIVATED. México: Guadalajara, Iltis & Nee 1667 (WIS); Cuernavaca, in park by Palacio Cortes,





*Moore 6207*. United States: California, Los Angeles, Vavra Estate, *Moore 6419, 6462* (BH); San Marino, Huntington Botanical Gardens 36339, *Hodel 788* (BH), originally from Durango; Huntington Botanical Gardens 25010, *Hodel 789* (BH), originally from Nayarit; New York, Ithaca, L. H. Bailey Hortorium, *Moore 8173 bis* (BH), originally from Michoacán. Germany: Hannover, *Wendland s. n.* (holotype of *C. karwinskyana*, GOET), originally collected by Karwinski in México; Munich, Botanische Garten, *Moore 7383* (BH).

Liebmann described and named *C. pochutlensis* from material that he collected near Pochutla in Oaxaca (Martius 1849). It is a variable species and occurs over a rather wide range of nearly 2,000 km (1,300 miles) in western México. It is not a common plant throughout its range and is usually found as isolated clumps on cliff sides in ravines and canyons.

Other than its original description and a few other short botanical accounts, mention of *C. pochutlensis* is lacking in the literature. It has been cultivated in California since the early 1900s, most of the plants there probably originating from collections made in México by Edward Howard for the Doheny Estate in Los Angeles. Plants probably of the same origin were at the Vavra Estate (formerly property of the University of California at Los Angeles) in the 1960s and some still exist at the Huntington Botanical Gardens in San Marino. The Huntington has added to its holdings of *C. pochutlensis* with recent collections from Durango and Jalisco in México.

Wendland described and named *C. karwinskyana* from material cultivated at

Herrenhausen and originally collected in México. Wendland obtained his material from Baron von Karwinski who introduced the species to Europe and who cultivated it at his garden in Munich.

*Chamaedorea karwinskyana* is mentioned frequently in horticultural accounts and was apparently cultivated as early as the 1840s in European greenhouses and Mediterranean gardens under the name *Chamaedorea elatior* (Wendland 1853a, Guillaumin 1923). Wendland (1853a) pointed out that this occurred when Martius (1837) confused *C. elatior* (which Martius himself had named in 1830) with another species recently introduced to European gardens from México. In his 1837 work, Martius erroneously illustrated this other species as *C. elatior*. Wendland (1853b) recognized this error and named this other species *C. karwinskyana*. According to Burret (1935) material referable to *C. karwinskyana* was still cultivated in European collections as *C. elatior* as recently as the 1930s.

Surprisingly, most plants of *C. pochutlensis* in California are misidentified as *C. costaricana*. The two are similar in their long-pinnate leaves but the ligules at the apex of the leaf sheath of *C. costaricana* easily distinguish it from *C. pochutlensis*. Hertrich (1951) discussed and Muirhead (1961) illustrated *C. pochutlensis* at the Huntington Botanical Gardens in San Marino, California erroneously as *Collinia elegans*.

Collectors have made a hybrid in California and perhaps elsewhere reportedly between *C. schippii* (= *C. graminifolia*) and *C. costaricana*. However, it is not *C. costaricana* but *C. pochutlensis* that was utilized as one of the parents with *C. schip-*

←

8. New side shoots of *Chamaedorea hooperiana* arise in a characteristically vertical fashion from behind persistent, woody leaf bases. 9-10. *Chamaedorea pochutlensis* forms handsome clumps in the conservatory at Balboa Park in San Diego, California. 11. A particularly striking clump of *Chamaedorea quezalteca* is in the garden of R. Palmer in Whittier, California.



*pii* (= *C. graminifolia*). Since *C. graminifolia* in cultivation is already hybridized and, therefore, not pure, the resulting offspring are in reality backcrosses with *C. pochutlensis*.

**Chamaedorea quezalteca** Standl. & Steyerl., Publ. Field Mus. Nat. Hist., Bot. Ser. 23: 204, 1947. Type: Guatemala, Quezaltenango, *Standley 87159* (holotype F).

*Legnea lacinata* O. F. Cook, Nat. Hort. Mag. 22: 134, 1943b, name of no botanical standing.

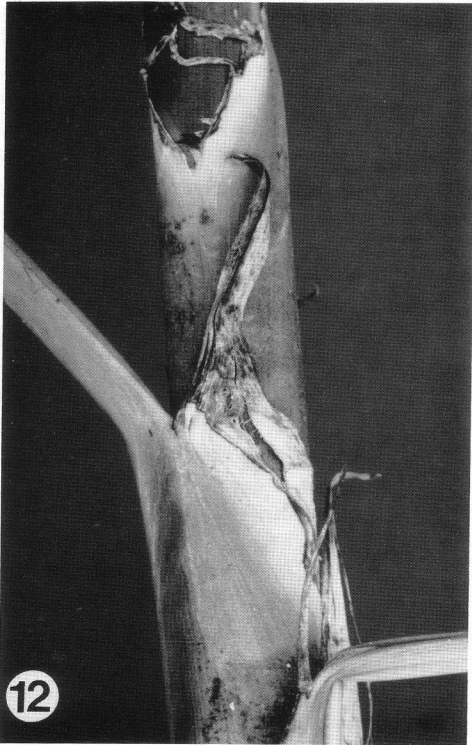
Stems sometimes with branches in place of inflorescences, to 4 m tall or more (Fig. 11), 1–3 cm diam., internodes to 20 cm long. Leaves 3–5, spreading; sheath 17–40 cm long, becoming dry and grayish and then persistent and durable, prominent ligules on either side of petiole at apex, these fibrous (Fig. 12), 4.5–10 cm long, becoming tattered; petiole 20–30 cm long; rachis to 1 m long with a pale band below extending onto sheath; up to 20 pinnae on each side of rachis, lanceolate, falcately acuminate, 30–45 × 3–5 cm, a midrib and 2 primary nerves on each side of this prominent above, secondaries slender, numerous, inconspicuous. Inflorescences infrafoliar, emerging through or from behind old sheaths at the nodes; peduncles slender, 30–45 cm long; staminate with rachis 10–15 cm long; rachillae 15–25, these 15–20 cm long, slender, spreading to pendulous; pistillate with rachis to 5 cm long; rachillae 6–10, these to 15–20 cm long, red-orange in fruit. Fruits black, globose, to 1 cm diam.

*Distribution:* GUATEMALA. MÉXICO. EL SALVADOR. HONDURAS. Dense, moist or wet forest on the Pacific and Atlantic slopes, 1,000–2,000 m elevation.

*Specimens Examined:* HONDURAS. Morazán: Cerro de Uyuca, *Moore 6754* (BH); *Glassman 2037* (GH). Comayagua: above Siguatepeque near El Achote,

*Yuncker et al. 6184* (GH, MICH, U). EL SALVADOR. Ahuachapán: Sierra de Apaneca, *Standley 20137* (F). GUATEMALA. Quezaltenango: Volcán de Zunil, *Standley 65423* (F); *Wendland 6* (GOET); Volcán de Santa María, *Standley 68331* (F); *Standley 87159* (holotype F); *Hodel & Castillo 901* (BH, AGUAT); Mazatenango, *Bunting & Licht 356* (F). San Marcos: San Marcos, *Hodel & Castillo 997* (BH, AGUAT); Aldea Fraternidad, *Williams et al. 26216, 26218* (F). Alta Verapaz: Cobán, *Moore 8224* (BH, F); *Hodel & Castillo 895* (BH, AGUAT). Huehuetenango: on Cerro Negro near Aguacate, *Hodel & Castillo 998* (BH, AGUAT). MÉXICO. Chiapas: Motozintla, *Breedlove 41701, 42826, 69095* (CAS); Ángel Albino Corzo, *Breedlove & Bourell 67428* (CAS); Rizo de Oro, Cintalapa, *Breedlove & Smith 21785, 31337* (CAS); La Independencia, *Breedlove 33617* (CAS). CULTIVATED. Guatemala: Universidad de San Carlos, *Hodel & Castillo 867* (BH, AGUAT); Huehuetenango, Hotel Zaculeu, *Iltis & Lind G-102* (WIS). México: Chiapas, San Cristobal de las Casas, *Breedlove & McClintock 23671* (CAS). United States: New York, Ithaca, Bailey Hortorium, *Moore 8224 bis* (BH), originally from Alta Verapaz, Guatemala; California, Whittier, garden of R. Palmer, *Hodel 783* (BH); Huntington Beach, garden of L. Rossten, *Hodel 800* (BH); both collections from California originally from Cerro Volcán Verde, El Salvador.

A handsome species with long-pinnate, flat leaves and clustering, smooth, green, canelike stems, Standley and Steyermark described and named *C. quezalteca* from a pistillate collection from the lower slope of Volcán de Santa María in Quezaltenango, Guatemala. We found it near the type locality on the Pacific slope and also near Cobán on the Atlantic slope. For such an obscure name, the plant is surprisingly widely cultivated in Guatemala, appearing in parks and plazas of many cities. Exceptionally fine specimens can be seen in the



12. The ligule at the apex of the leaf sheath of *Chamaedorea quezalteca* is long and fibrous. 13. *Chamaedorea seifrizii* with a typically tight cluster of numerous stems is at Waimea Falls Park and Arboretum in Hawaii.

Botanical Gardens in Guatemala City. In Quezaltenango, local residents sell the cut leaves for use in flower arrangements and bouquets.

*Chamaedorea quezalteca* is close to *C. costaricana* but can be distinguished by the nature of the ligules at the apex of the leaf sheath. In the former, these are fibrous and persistent (Fig. 12), attaining a length of up to 10 cm while in the latter they are membranous with the upper portion rotting or weathering away to leave a persistent triangular base only about 1–2 cm high.

*Chamaedorea quezalteca* is rare in cultivation outside of its native range, the only plants recorded occur in a few collections in southern California and in the greenhouse at the L. H. Bailey Hortorium at Cornell University, Ithaca, New York

where they are labeled *C. pulchra*. The plants in California were grown from seeds that Alan Bredeson of Lemon Grove collected from cultivated plants near Cerro Volcán Verde in El Salvador in 1976. Lois Rossten of Huntington Beach has a staminate plant and Richard Palmer of Whittier and Alan Bredeson have pistillate plants. We have successfully hand-pollinated Palmer's plant with pollen from Rossten's and fruits have been set and matured. The few plants, none mature, in the greenhouse at Cornell University in New York were grown from seeds collected by the late H. E. Moore, Jr. in Alta Verapaz, Guatemala. In addition, we distributed seeds in 1989 from Guatemala (Hodel & Castillo 867). *C. quezalteca* is susceptible to infestations of mites.

**Chamaedorea seifrizii** Burret, Notizbl.

Bot. Gart. Berlin-Dahlem 14: 268, 1938. Type: México, Yucatán, Chichén Itzá, *Seifriz s. n.* (holotype B, destroyed).

*Chamaedorea erumpens* H. E. Moore, Gentes Herb. 8: 232, figs. 96–97Aa, 1951. Type: Cult., *Moore 5830* (holotype BH).

*Chamaedorea erumpens* 'Fairchild' H. E. Moore, Gentes Herb. 8: 233, fig. 97B, 1951. Type: Cult., *Moore 5832* (holotype BH).

*Meiota campechana* O. F. Cook, Nat. Hort. Mag. 12: 138, 1943, name of no botanical standing.

Stems to 40 or more in fairly dense and tight clump (Fig. 13), to 3 m tall, 1–2 cm diam., white-spotted, ageing with a thin glaucous covering, internodes 5–20 cm long. Leaves 4–5, gray-green or green, ± stiff or drooping; sheath to 30 cm long, persistent; petiole to 10 cm long; rachis 30–45 cm long with very faint light green band extending onto sheath; pinnae 13–18 on each side of rachis, terminal ones 2–3 nerved, remainder 1-nerved with conspicuous midrib and numerous closely spaced and fine secondaries on each side of this, midrib prominent below, or 5–6 pinnae on each side of rachis with terminal pair 9-nerved, lanceolate or linear, straight, median ones largest, these to 20–35 × 0.8–3 cm, basal ones smaller, these 14–20 × 0.5–1.8 cm, subapical ones 10–15 × 1–1.5 cm, apical pair 8–15 × 2.5–3 or to 9 cm wide. Inflorescences infrafoliar, erumpent at base of old sheaths, short, stiff; staminate with peduncle 3.5–5.5 cm long; rachillae 5–12, these 7.5–15 cm long, stiff, erect; pistillate up to 7 per stem in flower and fruit at once; peduncle 3.5–8.8 cm long, erect; rachis 1–3 cm long; rachillae 4–6, these to 10 cm long, stiff, erect, orange in fruit. Staminate flowers aromatic. Fruits black, globose, 8 mm diam.

*Distribution*: MEXICO. BELIZE. GUATEMALA. HONDURAS. Open or dense, moist or wet woodland or forest on

the Atlantic slope, to 500 m elevation, often on limestone.

*Specimens Examined*: HONDURAS. Islas de Bahía: Roatán Island, *Molina 20715* (F). GUATEMALA. Petén: Tikal, *Hodel 847, 850* (BH). BELIZE. Orange Walk: August Pine Ridge, *Davidse & Brant 32751* (CAS); Yo Creek, *Hodel & Thomas 1131A, 1131B* (BH). Corozal: between Sarteneja and Chunox, *Davidse & Brant 32605* (CAS). MÉXICO. Campeche: east of Francisco Escarcega, *Reznicek et al. 222* (MICH). Quintana Roo: Xel-Ha, *Tillez 3557* (CAS). Yucatán: Chichén Itzá, *Moore 8096* (BH). CULTIVATED. United States: Florida, Fairchild Tropical Garden, *Moore 5830* (holotype of *C. erumpens*, BH), *5829* (BH); *Moore 5832* (holotype of *C. erumpens* 'Fairchild,' BH); *Moore 5831* (BH); cultivated collections from Florida originally from Belize; California, Whittier, garden of R. Palmer, *Hodel 794A, 794B, 795, 821* (BH). Belize: Cayo, Teakettle, *Hodel & Thomas 1133A, 1133B* (BH), originally collected at Beaver Dam, Mile 34, Western Highway, Belize.

Burret described and named *C. seifrizii* from material that William Seifriz collected near the Mayan ruins at Chichén Itzá in the state of Yucatán in México. Mayans cultivated it around their villages and temples as ornament and possibly for religious purposes. The Mayan names *xiat* and *chiat* mean near the edge of water, in apparent allusion to the habitat. I have observed *C. seifrizii* in Petén in northern Guatemala in low, seasonally swampy or boggy situations. In fact, local people state that it is mainly confined to "baja tierra" or low land. Although not named until 1938, others, like Millspaugh (1898) and Standley (1930), encountered it at an earlier date but listed it under other names.

As interpreted here, *C. seifrizii* displays a tremendous amount of foliar variation in the wild although the flowers are essentially the same in the various types and forms. Burret's *C. seifrizii* is typified by stiff leaves

with narrow, linear, and upright pinnae. Moore described and named *C. erumpens* from plants cultivated at Fairchild Tropical Garden in Miami, Florida. These plants had apparently been brought in from Belize or grown from seeds that William Schipp sent and by 1950 had become quite popular in south Florida and were used extensively as an indoor decorative as well as in the exterior landscape. Moore noted two leaf forms in *C. erumpens*. That with the pinnae regularly arranged he selected as the type. The other, with the terminal ones united and much broader, he designated as a horticultural variety honoring Dr. David Fairchild. Both types were growing together at Fairchild Tropical Garden and presumably had come from the same lot of seeds. Moore stated that he found no differences other than in the foliage.

Moore (1951) continued in his discussion and stated that *C. erumpens* was similar in floral morphology with its close relative *C. seifrizii* and the differences were mainly in the shape and nervation of the pinnae. *C. erumpens* had lanceolate rather than linear pinnae that were at least twice as broad as those of *C. seifrizii*. In addition, he noted *C. seifrizii* as being a scrambling palm. When considered over its entire range, the shape and size of pinnae are a variable character and of dubious merit in distinguishing between these two taxa. In fact, there is less foliar variation between Burret's typical *C. seifrizii* and Moore's typical *C. erumpens* than between the latter and its horticultural variety 'Fairchild.' In Belize, I have observed leaves of both extreme types of pinnae (*seifrizii* and *erumpens*) on the same plant. The scrambling nature of certain forms is probably not a reliable character either. Rather, it seems to be a function of age and of the amount of light; older plants in lower light seem to lean and scramble more while those in higher light are more compact, stiff, and upright. The amount of light also affects the stiffness of the leaves. Those in higher light have stiff, somewhat v-shaped, upright

pinnae while those in lower light have drooping, flat, softer pinnae.

Not abundant in the wild, *C. seifrizii* occurs as scattered clumps in disturbed woodland or forest. In Orange Walk, Belize, it grows in disturbed forest or woodland remnants on the margins of sugarcane fields where it is subjected to exceedingly dry conditions for several months each year. *C. seifrizii* is very widely cultivated and appears in gardens and collections in California, Hawaii, Florida, Europe, Australia, the Far East, and elsewhere. In fact, it is highly likely that more plants are in cultivation than in the wild. Often occurring naturally on limestone outcroppings in its native habitat, *C. seifrizii* is well adapted to culture in south Florida where extensive plantings now exist.

The commercial industry recognizes two forms of *C. seifrizii*. One, the most popular, more or less corresponds to Burret's type with stiff leaves and narrow, linear, upright pinnae while the other falls into Moore's type with softer leaves and broader, flat pinnae. Extensive plantings of both forms have existed in south Florida for years and have served as a source of breeding stock for commercial seed production. Much hybridizing has occurred between the two and this, coupled with the natural variation within the species, has resulted in innumerable variants or breeding lines in the trade. In fact, most of the material produced commercially in Florida is called, for lack of a better term, Florida Hybrid.

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