



9. A staminate plant of *Chamaedorea stenocarpa*, D. R. & M. A. Hodel 619A, grows at the JBRCW, Costa Rica.

San Ramón, S. Brenes 6111 (CR). Heredia: Varablanca, R. Roig 12 (F, CR). PANAMA. Veraguas: Santa Fe, S. Mori & J. Kallunki 3113 (MO), 3843 (BH, MO); T. Croat 27694 (MO); Río Segundo, P. Maas & R. Dressler 1656 (U). CULTIVATED. Costa Rica. Puntarenas: San Vito de Coto Brus, JBRCW, D. R. & M. A. Hodel 619A, 619B (BH). United States. California: La Habra, in the garden of L. Hooper, D. R. Hodel 824A, 824B (BH), originally received from JBRCW, Costa Rica. Hawaii: Honolulu, Ho'omaluhia Botanic Garden of the Honolulu Botanic Gardens, D. R. Hodel 833 (BH), accessioned as HBG 77.1331, originally collected at JBRCW, Costa Rica.

*Chamaedorea stenocarpa* is closest to *C. pygmaea* but can be distinguished by the greater number of pinnae that decrease markedly in length and in a progressive manner toward the apex of the rachis.

The late Robert G. Wilson of San Vito in southeastern Costa Rica is responsible for introducing this species to cultivation.

In the 1960s he established fruiting populations in his garden, JBRCW. One of these plants in Wilson's garden is handsomely illustrated on the cover of *Principes* Vol. 25, No. 2, April, 1981. These plants were brought to him by local collectors or collected by Wilson in forest remnants in the mountains above San Vito, Costa Rica. Over the years, he distributed seeds and plants as the "Las Cruces elfin dwarf" or "dwarf pinnate" *Chamaedorea* to interested collectors and hobbyists. Today, *C. stenocarpa* is cultivated in Hawaii, California, Florida, Australia and, probably, elsewhere.

***Chamaedorea undulatifolia* D. R. Hodel & N. W. Uhl. sp. nov.** (Figs. 10-13).

Subgeneris *Chamaedoropsis* Oerst. *C. scheryi* L. H. Bailey affinis sed segmentis marginibus undulatis, rachillis fructificantibus valde recurvatis et unciformibus differt. Typus: H. E. Moore Jr. 10179 (Holotypus BH).

Stem solitary, appearing acaulescent but actually creeping at or slightly below the leaf litter, densely ringed, nodes prominent and swollen, internodes very short, to 5 mm long, overall height including leaves 1–1.5 m.

Leaves 3–5 (Fig. 10), erect-spreading, pinnate; sheath to 10 cm long, green, brown-margined apically, splitting deeply opposite the petiole, clasping completely in a tubular manner only near the base; petiole elongate, to 60 cm long, green and flat or very slightly channeled adaxially, green and rounded abaxially; rachis to 50–75 cm long, green and slightly angled adaxially, green and rounded abaxially; pinnae 12–18 on each side of the rachis, bright forest green, thin, lower margin decurrent along the rachis, lanceolate, slightly sigmoid, acuminate, alternate or subopposite, lower and central pinnae the largest, these to 12.5–19 × 1.6–2.7 cm, becoming progressively smaller toward the apex of the rachis, margins undulate (Figs. 12,13), midrib prominent and 1–2 lateral nerves on either side of this adaxially and abaxially, these yellowish when dry, midrib with warty-roughened surface at the base abaxially.

Inflorescences interfoliar, erect, sometimes infrafoliar in fruit, frequently appearing to arise from the ground, glabrous. Staminate inflorescence to 70 cm high but often smaller; peduncle to 47 cm long, greenish at anthesis; bracts 6, these tubular, tightly sheathing, acute-acuminate, bifid, longitudinally striate-nerved, ± papery, green but browning at anthesis; rachis 24 cm long, greenish at anthesis; rachillae 30, green, slender, lower ones the longest, these to 15 cm long, spreading, simple or once-branched, those above the middle shorter, to 5–11 cm long. Pistillate inflorescence to 55 cm long but often smaller; peduncle to 44 cm long, greenish at anthesis, orange in fruit; bracts 8, these similar to those of the staminate; rachis very short, 0.25–2.5 cm long, green at anthesis, orange in fruit; rachillae 2–6,

2.5–11 cm long, strongly recurved, hook-like (Fig. 11) and orange in fruit.

Staminate flowers green, 1.5–2 mm high; calyx membranous, shallowly 3-lobed, 0.5 mm high, flaring and drying light brown with darker margins; corolla with the petals valvate, drying dark, 1.5 mm high, ovoid, ± acute, free at anthesis; stamens with the anthers sessile, not deeply bifid at the apex; pistillode slightly shorter than anthers, 3-angled and ± angled-enlarged at the apex. Pistillate flowers with the calyx flaring, briefly 3-lobed, similar to that of the staminate; corolla 2 mm high, petals valvate but separating and recurving only at the tip at anthesis and corolla ± urceolate; pistil green. Fruits black, ellipsoid-globose, 8 × 6 mm; perianth persistent but not prominently nerved when dry.

*Distribution:* COSTA RICA. Puntarenas. Alajuela. Heredia. San José. Dense, wet montane forest and cloud forest on the Atlantic slope or just over the Continental Divide, 800–1,700 m elevation. Probably endemic.

*Specimens Examined:* COSTA RICA. Puntarenas: Monteverde, *H. E. Moore Jr. et al.* 10179 (Holotype, BH), 10180 (BH); *D. R. & M. A. Hodel* 695A, 695B (BH, CR); *B. Hammel* 13867 (MO, CR); *V. Dryer* 149, 150B, 185, 273 (CR). Alajuela: La Peña de Zarcero, *A. Smith H-1005* (F); La Paz, NW of San Ramón, *R. Liesner et al.* 15476 (MO); Balsa, NW of San Ramón, *R. Liesner & E. Judziwicz* 14886 (MO, CR). Heredia: *M. Valerio* 1590 (F). San José: Braulio Carrillo National Park, *R. Chazdon* 225, 236 (CR). Cartago: Quebrada Casa Blanca at Tapantí, *M. Grayum & P. Sleeper* 3691, 3692 (MO).

The specific epithet refers to the leaves with the pinnae having undulate margins. Chazdon (in *Brenesia* 28: 107–116, 1987) referred to *C. undulatifolia* as *Chamaedorea* sp. “elegantissima.” Because of its stemless habit and decurrent pinnae with strikingly undulate margins, *C. undulatifolia* bears a remarkable resemblance,

especially when young, to certain ferns in the genus *Polypodium*. Although the undulating margins of the pinnae are quite striking and occur even on material cultivated in Costa Rica and California, they are not readily apparent on dried herbarium material.

*Chamaedorea undulatifolia* is similar to *C. scheryi* but can be distinguished by the undulate margins of the pinnae and the pistillate rachillae strongly recurved and hooklike, rather than straight, in fruit (Fig. 11).

### Cultivation

That they are confined to a climate with such constant, exacting parameters is probably largely responsible for difficulty in cultivating members of the pinnatifid group. They are notoriously difficult to grow well and never appear as vigorous as those in the wild. They seem to do best in a moderate or slightly cool tropical climate with little variation. These conditions are difficult to duplicate in cultivation. Even in places renowned for benign climate such as wet areas of Hawaii, plants do not attain the same quality as in the wet mountain forests of Costa Rica and Panama. In places like California, they fare even worse, tending to hold very few leaves and these are marred by the pinnae with yellow and brown tips. The "tip burn" so characteristic of the pinnatifid group in cultivation is probably due to low atmospheric humidity and, to a certain extent, extremes of temperature.

Generally, in cultivation plants have crowns which are much reduced, being composed of only two-three leaves, and take on a rather poor appearance. In addition, they are susceptible to infestations of mites and thrips in cultivation, especially in areas of low humidity. Naturally slow-growing, they are even slower in cultivation and, more often than not, languish

and go into a slow decline from which they seldom recover.

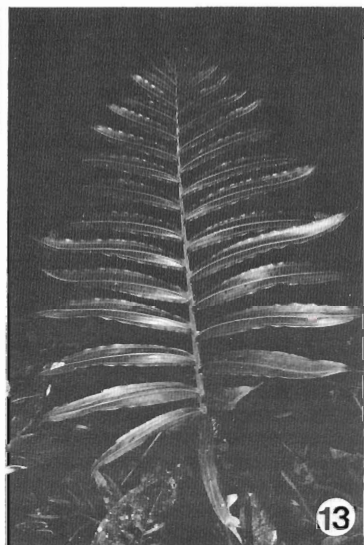
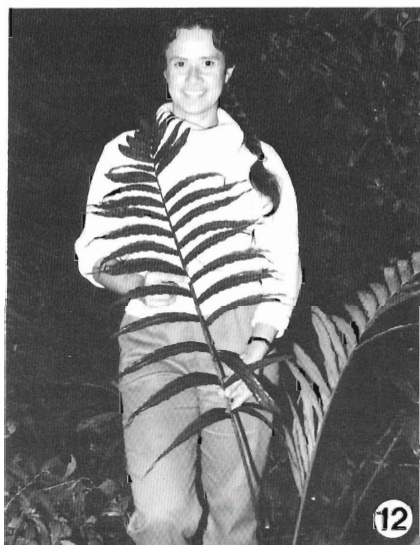
Growers of species in the pinnatifid group may have the best results by using a well drained medium high in organic matter and a slow release, organic type of fertilizer, situating the plants in deep shade, and, if possible, maintaining constant temperatures between 15 and 27° C (60–80° F) and relative humidities above eighty percent. These conditions are sometimes difficult to maintain. In addition, periodic leaching of the root zone with distilled or rain water would be beneficial in areas where water quality is poor and/or mineral content is high.

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10. *Chamaedorea undulatifolia*, D. R. & M. A. Hodel 695B, in cloud forest at the type locality, Monteverde, Costa Rica. 11. Fruiting rachillae of *Chamaedorea undulatifolia* are strongly recurved and hooklike, D. R. & M. A. Hodel 695B. 12. Marianne Hodel holds leaf of *Chamaedorea undulatifolia*, D. R. & M. A. Hodel 695A, at the type locality. Note the undulate margins of the pinnae. 13. A close-up of a leaf of a young plant of *Chamaedorea undulatifolia* at the type locality clearly shows the undulate margins of the pinnae.