Chamaedorea Palms 20 Years After

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1 *Chamaedorea plumosa* occurs on rocky limestone slopes in deciduous thorn forest at middle elevations in the great interior valley of Chiapas, Mexico, as here outside of Tuxtla Gutierrez; photo taken at the height of the rainy season.

It is hard to believe but over 20 years have passed since the International Palm Society published *Chamaedorea Palms* (Hodel 1992a), my monograph of this popular and widely cultivated genus. Since then new species have been identified, named and described, most in the pages of *Principes* and *Palms*; nomenclatural changes have reduced some species to synonymy while resurrecting at least one from a similar fate. New information has come to light that further enriches our understanding of this remarkable group of palms. Here I provide a summary of these developments in the past 20 years, emphasizing and/or illustrating those not previously discussed in this journal or where appropriate images were lacking.

New Species

Nineteen new species have been named and described since *Chamaedorea Palms* (*CP*) was published in 1992 although one, *Chamaedorea coralliformis*, has since been placed in synonymy with *C. crucensis*. Table 1 summarizes these 18 new, accepted species. Several of these new species now figure prominently in horticulture and are in gardens and collections around the world. John Ingwersen of Jungle Jack's Palms in Oceanside, California has championed two of these, *C. plumosa* and *C. benziei*, and they are now available in the worldwide trade. I described both these Mexican species and two others in Principes (Hodel 1992b), and because I had not seen them in the wild, I based them on cultivated plants in southern California. However, I saw both in the wild on trips to México in 1993 and 2000, enabling me to provide additional information about their habitat.

Chamaedorea plumosa, which is like a dwarf, slender version of the queen palm (*Syagrus romanzoffiana*) and which Jungle Jack's Palms markets under the trademarked name Baby Queen in allusion to this similarity, occurs on rocky slopes and among large, table-like slabs of limestone rocks in deciduous thorn forest at middle elevations in the great interior valley of Chiapas, México (Figs. 1 & 2). This seasonally dry forest, which receives little or no rain for a great part of the year and is mostly leafless during this time, is home to many cacti and other succulent plants. Similar in appearance to *C. glaucifolia, C. plumosa* differs in its larger, more robust habit, adaxial (upper) surface of the petioles with a prominent groove or channel, lack of glaucous covering on petioles and rachises, pinnae arising from the rachis in a more pronounced plumose fashion and staminate (male) flowers with the petal tips free and spreading. Surprisingly, the two species grow not too far apart at one location outside Tuxtla Gutiérrez, the capital of Chiapas. *Chamaedorea glaucifolia* occurs at higher elevations in moist cloud forest overlooking the spectacular Sumidero Canyon while *C. plumosa* is found about 10 kilometers away but at lower elevations. While the latter also occurs much farther to the southeast in

Table 1. List of new, accepted species of *Chamaedorea* since publication of *CP* in 1992.

Species	Origin	Reference
C. anemophila	Panama	Hodel 1995
C. benziei	Mexico	Hodel 1992b
C. binderi	Costa Rica	Hodel 1996
C. christinae	Colombia	Hodel 1997
C. frondosa	Honduras	Hodel et al. 1995b
C. hodelii	Costa Rica	Grayum 1998
C. ibarrae	Mexico	Hodel 1992b
C. incrustata	Costa Rica	Hodel et al. 1997
C. keelerorum	Guatemala, Mexico	Hodel 1992b
C. moliniana	Honduras	Hodel et al. 1995b
C. piscifolia	Costa Rica	Hodel et al. 1997
C. plumosa	Mexico	Hodel 1992b
C. ponderosa	Panama	Hodel 1997
C. recurvata	Panama	Hodel 1995
C. ricardoi	Colombia	Bernal et al. 2004
C. rosibeliae	Costa Rica	Hodel at al. 1997
C. rossteniorum	Costa Rica	Hodel et al. 1997
C. subjectifolia	Panama	Hodel 1995

2 (left). Juan José provides scale for *Chamaedorea plumosa* among large, table-like slabs of limestone rocks in deciduous thorn forest southeast of San Cristobal de las Casas in Chiapas, Mexico (*Hodel 1158*). 3 (right). *Chamaedorea benziei* occurs in high-elevation but surprisingly somewhat dry cloud forest in southwestern Chiapas on the border with Oaxaca, Mexico (*Hodel 1168*).

Chiapas beyond San Cristóbal de las Casas, it is remarkable that two species of such similar and distinctive habit but otherwise not closely related can occur so close to each other.

Chamaedorea benziei occurs in high-elevation but surprisingly somewhat dry cloud forest in southwestern Chiapas, on the border with Oaxaca, México (Fig. 3). Then palm-seed dealer Inge Hoffmann of San Leandro, California, Juan José Castillo of the Universidad de San Carlos in Guatemala and I observed it there in early 1993. Similar to *C. carchensis* from adjacent Guatemala, *C. benziei* has ascending to arching, thick, dark green leaves and ascending, long-stalked inflorescences. When young it is somewhat reminiscent in foliage and habit of the sentry or kentia palm (*Howea forsteriana*) and is suggested as a substitute for this species as a potted subject for decorative use (Fig. 4).

In the same article (Hodel 1992b) I described the elusive and perplexing *Chamaedorea ibarrae*, basing it on herbarium specimens only, which provided no information about its habit. I searched for it twice but without success in high-elevation, moist cloud forest in the mountains surrounding San Cristóbal de las Casas where it reportedly grew. Finally in 2000 I found it cultivated in a residential garden in San Cristóbal de las Casas and can now provide photographs of this striking species. A handsome plant with no visible, above-ground trunk, it has dark, velvety, nearly iridescent green leaves in a compact rosette arising directly from the ground (Fig. 5). In habit *C. ibarrae* is similar to the well-known *C. radicalis*, but the flowers and the leaf texture and color of the two species are clearly distinct. Other than the one plant cultivated in San Cristóbal de las Casas, I have seen no other plants of *C. ibarrae*, which is unfortunate because it is an attractive species and one worthy of gracing our gardens and collections.

Chamaedorea frondosa, another species named in *Principes* (Hodel et al. 1995b), deserves greater attention for its numerous good qualities. Found in wet, high-elevation cloud forests in Honduras, this exceptionally handsome species has performed superbly in

4. *Chamaedorea benziei* is somewhat reminiscent when young in foliage and habit of the sentry or kentia palm (*Howea forsteriana*) and is suggested as a substitute for this species as a potted subject for decorative use (cultivated, Lotusland, Santa Barbara, CA).

the *Chamaedorea* Research Collection in Los Angeles, flowering and fruiting readily for many years (Fig. 6). I have shared seeds and plants with collectors, growers and gardens in California, Florida, Hawaii, Europe and Australia. This remarkable species holds up to 20 thick, corrugated, simple and bifid, sometimes slightly mottled but rich, dark green to nearly gray green leaves. Complementing these handsome leaves are the inflorescences that hold the conspicuous if not showy bright yellow flowers and later the black fruits on orange-red spikes outside the leafy canopy (Figs. 7 & 8). Vigorous and easy to grow in Los Angeles, it sustained no damage in the January 2007 cold spell, when temperatures dipped slightly below freezing and severely damaged or killed nearby *C. ernesti-augusti*.

Chamaedorea piscifolia is the most remarkable of the new species and one of the most distinctive species of *Chamaedorea*, ranking with *C. tenerrima* and *C. tuerckheimii* for unusual leaves. Gerardo Herrera and Alfredo Cascante of the Costa Rican National Museum and I described this species, which is remarkable on several counts but might now be extinct, and three other *Chamaedorea* in the *Palm Journal* after late 1996 field work in Costa Rica (Hodel et al. 1997). *Chamaedorea piscifolia*, which we found in wet, incredibly rich and

5. The elusive and perplexing *Chamaedorea ibarrae*, a strikingly handsome plant with no visible, above-ground trunk, has dark, velvety, nearly iridescent green leaves in a compact rosette arising directly from the ground (cultivated, San Cristobal de las Casas, Chiapas, Mexico).

6. *Chamaedorea frondosa*, an exceptionally handsome species, has performed superbly in the *Chamaedorea* Research Collection, flowering and fruiting readily for many years (*Hodel 1274 bis*).

diverse mountain rain forest on the Pacific slope of Costa Rica, has small, corrugated leaf blades similar to those of the potato-chip palm (*C. tuerckheimii*) except they have distinctive, drawn out, bifid tips lending a fish shape to the blade to which the specific epithet alludes (Fig. 9). The spicate or few-branched inflorescences are borne at such a distance (60–90 cm) from the leaves on slender, bare, creeping, prostrate, often buried stems that they are difficult to associate with any given plant (Fig. 10). Indeed, in such cases they arise directly from the bare ground or leaf litter in an isolated manner and are frequently overlooked or escape attention as palm inflorescences until one traces back the stem to the plant. Unfortunately, I heard that the forest where this palm grows was largely destroyed, so the continued survival of this species is doubtful.

Two of the three other species named in the 1997 *Palm Journal* article are worthy of elaboration. One, *Chamaedorea rossteniorum*, which honors long-time International Palm Society members Kurt Rossten and his late wife Lois of Huntington Beach, California, is a striking species from Costa Rica and Panama. A handsome ornamental, *C. rossteniorum* has a rosette of dark green, ascending to spreading, thick, somewhat leathery, often large, simple and bifid leaves, and unusually long inflorescences that hold yellow flowers and attractive black fruits on red-orange rachillae well clear of the foliage (Fig. 11). In *CP,* I actually included it with *C. stricta* from México and Guatemala, a species of similar habit, leaves and inflorescences but different staminate (male) flowers. Unfortunately, at the time, staminate flowers of the Costa Rican and Panamanian material, crucial for differentiating many species of *Chamaedorea*, were unavailable. However, in early 1996 I suspected that the Costa Rican and Panamanian plants were different when a plant from Panama in the *Chamaedorea* Research Collection produced staminate flowers that in their connate (joined) petal tips were amply distinct from those of *C. stricta* with its free and spreading petal tips. This suspicion was confirmed in late 1996 when Gerardo, Alfredo and I made good collections of staminate flowers from plants on the Pacific and Atlantic slopes (Fig. 12) of Costa Rica that clearly showed them to be distinct from *C. stricta*.

Named in the same 1997 *Palm Journal* article and not as striking as either *Chamaedorea piscifolia* or *C. rossteniorum* but, nonetheless, equally interesting, *C. incrustata* is unique in the genus by virtue of its conspicuously rough,

7 (left). Inflorescences of *Chamaedorea frondosa* hold the conspicuous if not showy bright yellow flowers above the handsome, leafy canopy (*Hodel 1275 bis*, cultivated, *Chamaedorea* Research Collection). 8 (right). Orange-red infructescences of *Chamaedorea frondosa* hold the black fruits outside the leafy canopy (*Hodel 1274 bis*, cultivated, *Chamaedorea* Research Collection).

crusty rachis and rachillae to which the specific epithet alludes. The crusty surface, reminiscent of some types of plate- and fan-shaped tropical corals, is the result of extraordinary encrustations arranged along the longitudinal ridges of the rachis and rachillae (Fig. 13). On their margins and apices they bear clusters of star-shaped, slender hairs, also diagnostic for this species. This rare plant from mountain rain forest on the Pacific slope of Costa Rica is also distinctive in its blue-green, strongly cupped, boat-like pinnae (Front Cover).

In 1998 Michael Grayum, friend, colleague and exceptional student of Costa Rican plants at the Missouri Botanical Garden in St. Louis, described five new species of palms from Costa Rica, including one that in *CP* (Plates 115 B–E) I had included and illustrated as *C. crucensis* (Grayum 1998). This new species, a member of subgenus *Stephanostachys*, has spicate inflorescences with densely packed, contiguous flowers and fruits, the latter appearing like kernels on an ear of corn. Grayum argued persuasively that this new species from the Atlantic slope of Costa Rica differed substantially from *C. crucensis* from the Pacific slope, and he named it *C. hodelii* in my honor.

Nomenclatural Changes

In his work on the Costa Rican flora Grayum (1998, 2003) put several species of *Chamaedorea* into synonymy (Table 2). While I agree with most of these, I take exception to his inclusion of *C. tenella* with *C. geonomiformis* and *C. minima* and *C. sullivaniorum* with *C. pumila*. In the case of *C. tenella* and *C. geonomiformis*, they are at least horticulturally distinct, the former being distinctively smaller and with spicate (unbranched) inflorescences, while the latter is a much larger plant with inflorescences typically having up to five rachillae. There are no intermediate forms, and their ranges do not appear to overlap. *Chamaedorea geonomiformis* is restricted to lower elevations in Belize, Guatemala, Honduras and México while *C. tenella* occurs at middle elevations in México and low elevations in Costa Rica.

The case of *Chamaedorea minima*, *C. sullivaniorum* and *C. pumila* is somewhat more

Table 2. *Chamaedorea* synonymized by Grayum (1998, 2003) since publication of *CP* in 1992.

Previous Name	Accepted Name
C. chazdoniae	*C. dammeriana*
C. coralliformis	*C. crucensis*
C. minima	*C. pumila*
C. pedunculata	*C. macrospadix*
C. quezalteca	*C. costaricana*
C. selvae	*C. lucidifrons*
C. sullivaniorum	*C. pumila*
C. tenella	*C. geonomiformis*

troubling. While the three species do represent somewhat of a continuum but with three clearly demarcated entities, with *C. minima* (Fig. 14) the smallest and *C. sullivaniorum* (Fig. 15) the largest, both these latter species grow side by side in at least one location in wet mountain rain forest on the Pacific slope of Costa Rica (with *C. piscifolia*!) and there are no intermediate forms, suggesting that the two are distinct.

In the case of *Chamaedorea selvae* being put into *C. lucidifrons*, I had suggested this change as early as 1996 (Hodel & Binder 1996) and Grayum did it formally (2003). It has now appeared as a synonym in the on-line Kew World Checklist of Selected Plant Families (Govaerts et al. 2011). In our 1996 account, I copiously illustrated *C. lucidifrons*, which enhanced the description and one illustration of this species I had included in *CP*.

In another noteworthy case of synonymy, Ramón Zuñiga of the Escuela Agrícola Panamericana in Honduras, Juan José Castillo and I proposed (successfully as it turned out) that the name *Chamaedorea seifrizii*, a well-known, widely cultivated and commercially important species, should be conserved over *C. donnell-smithii*, an earlier name for an obscure, mostly unknown species (Hodel et al. 1995c). In *CP* I treated *C. donnell-smithii* as an imperfectly known species because the original specimen was a leaf fragment and the meager description told us little about this plant. In 1994 Ramón, Juan José and I visited the type locality of *C. donnell-smithii* in Honduras, and the only palm we encountered at the site was *C. seifrizii*. Comparing the leaf fragment of the original material of *C. donnell-smithii* to the leaf of *C. seifrizii* showed that they were a good match, clearly suggesting that they were one and the same (Hodel et al. 1995a). Because the rules of botanical nomenclature state that older names generally have priority, the newer but well-known *C. seifrizii* should become a synonym of the older but poorly known *C. donnell-smithii*, a situation that would have created chaos and confusion in the commercial horticultural trade and in the botanical world concerning the appropriate name for this species. Fortunately, the rules make exceptions for special cases like ours where the older name is poorly known and little used while the newer name is well known and widely used. We argued successfully on these grounds that *C. seifrizii* should be conserved over *C. donnell-smithii*, effectively rejecting the older, latter name and making it a synonym of the newer *C. seifrizii*.

Sometimes, when new information comes to light, species that were once considered synonyms of other species can be taken out of synonymy and "resurrected." This case is exactly what happened with *Chamaedorea schippii*, an unusual, multi-stemmed species with long-pinnate leaves and multi-nerved pinnae from limestone hills in Belize and

9. *Chamaedorea piscifolia* is one of the most distinctive species in the genus, ranking with *C. tenerrima* and *C. tuerckheimii* (potato-chip palm) for unusual leaves (*Hodel 1239*, Pacific slope, Costa Rica).

10 (top). The spicate or few-branched inflorescences (center right) of *Chamaedorea piscifolia* are borne at a distance (60 to 90 cm) from the leaves on slender, bare, creeping, prostrate, often buried stems (*Hodel 1239*, Pacific slope, Costa Rica). 11 (bottom). *Chamaedorea rossteniorum* has simple, bifid leaves and long inflorescences (cultivated, Lyon Arboretum, *Hodel 1541 bis*, *ex* Atlantic slope, Costa Rica).

Guatemala. In *CP* I treated *C. schippii* as a synonym of *C. graminifolia*, a poorly known species from Costa Rica that had not been collected or seen there in over 75 years and was thought to be extinct. In 1994 I began to suspect that the two pecies were actually distinct after I saw cultivated material that I interpreted as *C. graminifolia* in the nursery of

Gerardo Herrera outside San José, Costa Rica and that he had collected on Cerro Nimaso in the remote, rugged, wet mountains of eastern Costa Rica (Fig. 16). This cultivated material was solitary stemmed and had numerous, straight, long, narrow, one-nerved, grass-like pinnae, both of which make it distinct from *C. schippii*. I returned to Los Angeles with a few small plants that Gerardo gave me and when they flowered in the *Chamaedorea* Research Collection the staminate flowers had free and spreading petal tips rather than the connate petal tips of *C. schippii.* Later Michael Grayum resurrected *C. schippii*, basing his decision on a review of the literature and an examination of the original material of both species, old, historic specimens and the living plants of *C. graminifolia* in Herrera's nursery.

Chamaedorea graminifolia differs from *C. schippii* in its solitary rather than multi-stemmed habit, one-nerved, bright green rather than multi-nerved, grayish or dull green pinnae, and staminate flowers with petal tips free rather than connate. All illustrations captioned as *C. graminifolia* in *CP* are actually *C. schippii*. The resurrection of *C. schippii* affects the name of one of the parents I listed for *C.* × 'Irving Cantor' when I named this hybrid in *CP* (p. 226). I listed *C. graminifolia* as one of the parents (along with *C. pochutlensis*), but because the material used in this hybrid was from southern Mexico, Guatemala or Belize, *C. schippii* rather than *C. graminifolia* should be listed as one of the parents.

A discussion about nomenclatural changes in *Chamaedorea* would be incomplete without addressing the case of the suggested synonyms in the Henderson et al. (1995) treatment of American palms. While it is an excellent work, I feel that the authors were somewhat overzealous in their reduction of many *Chamaedorea* names to synonyms. While a few of these reductions have been verified, most have not. They seemingly ignored critical floral and other differences and suggested the lumping of species in several "species pairs" that were similar only in habit and perhaps slightly in leaf. For example, they noted that with the pairs *C. amabilis–C. sullivaniorum*, *C. palmeriana–C. pumila*, *C. pinnatifrons–C. oblongata*, *C. glaucifolia–C. plumosa*, *C. geonomiformis–C. rigida* and *C. graminifolia–C.*

12 (left). *Chamaedorea rossteniorum* occurs on the Atlantic slope of Costa Rica (*Hodel 1541*). 13 (right). *Chamaedorea incrustata* is unique in the genus by virtue of its conspicuously rough, crusty rachis and rachillae. (*Hodel 1532*, Pacific slope, Costa Rica).

seifrizii, among many others, that the floral differences might simply be a variation in the degree of staminate petal spreading and that they are not really distinct species. They discounted or ignored other critical characters, like petal thickness and nervation, leaf blade thickness, texture and nervation and differences in stems and leaf attachment. I have intimate knowledge of all these species, having observed and photographed them in the wild, examined countless herbarium collections, and, in many cases, grown them into mature plants from seeds. I can say without a doubt that the species in these pairs and others are distinct species, and evolving DNA evidence has to a large extent supported my position (Cuenca & Asmussen-Lange 2005, Thomas et al. 2006).

Thomas et al. (2006) also showed, though, that the less species-rich subgenera are convincingly monophyletic and can be distinguished using morphological characters while, in contrast, the two largest subgenera, *Chamaedorea* and *Chamaedoropsis*, which I distinguished from each other primarily by the degree of connation in the staminate petals, are both resolved as highly polyphyletic, indicating that this character used to distinguish them is unreliable.

New Information

In December 1989 my late father and I were in moist oak-pine forest and cloud forest well up on the rugged, dirt road from the then sleepy, Pacific surfside hamlet of Puerto Escondido to the city of Oaxaca in Oaxaca, México. As was typically the case when my father accompanied me on plant exploration trips, he stayed in the auto parked along the road and contentedly read a book while I wandered off into the forest. Under oaks and pines and among large, smooth rocks on steep, decomposed granite slopes above the road, I found a rather nondescript, pinnate-leaved *Chamaedorea* that I initially thought was solitary stemmed, like *C. oblongata* or *C. pinnatifrons*. However, I quickly realized that it was multi-stemmed when I tried to gather one for a herbarium specimen and traced the base of the stem to a rhizome that extended to another plant nearly three meters away! I was unaware of any *Chamaedorea* with such widely spreading, rhizomatous stems. I was nearly breathless with excitement as I searched for flowers or fruits but found neither, so I had to be content with gathering a few pieces of rhizomes to try to establish this plant in the *Chamaedorea* Research Collection.

14. In wet, rich, mountain forest on the Pacific slope of Costa Rica, *Chamaedorea minima* (*Hodel 1537*) occurs with *C. sullivaniorum* (see Fig. 15) and there are no intermediate forms, suggesting that the two are distinct.

Based on its strongly rhizomatous habit, I named this species *Chamaedorea rhizomatosa* and included it in subgenus *Chamaedoropsis* in *CP* but only somewhat tentatively because staminate flowers were lacking. The pieces of rhizomes I had brought back to Los Angeles grew vigorously and plants flowered for the first time in December 1992 (Fig. 17). All the plants were staminate, even though I had selected pieces of rhizomes from different locations several meters distant. Much to my surprise and excitement, they were not the typical yellow flowers with spreading petal tips characteristic of subgenus *Chamaedoropsis*. Instead, they had bright orange, thick, fleshy petals hooded over the shorter stamens and pistillode, clearly placing this species in the distinctive and popular subgenus *Eleutheropetalum*, which includes *C. ernesti-augustii*, *C. metallica*, *C. sartorii* and *C. stolonifera*!

Chamaedorea rhizomatosa has pinnate leaves similar to those of *C. sartorii* and the rhizomatous habit of *C. stolonifera*, although

even more excessively so, making it a most intriguing species. An unusually vigorous grower, one small piece of rhizome in December 1989 grew into a plant with three stems each about a meter tall that I planted out in 1994. By 2004 it had 12 stems to three meters tall, numerous smaller stems, and had spread to cover an area about three meters

15 (top). *Chamaedorea sullivaniorum* (*Hodel 1535*) occurring with *C. minima* (see Fig. 14). 16 (bottom). The elusive and poorly known but aptly named *Chamaedorea graminifolia* is solitary stemmed and has numerous, narrow, grass-like pinnae (cultivated, San Jose, Costa Rica).

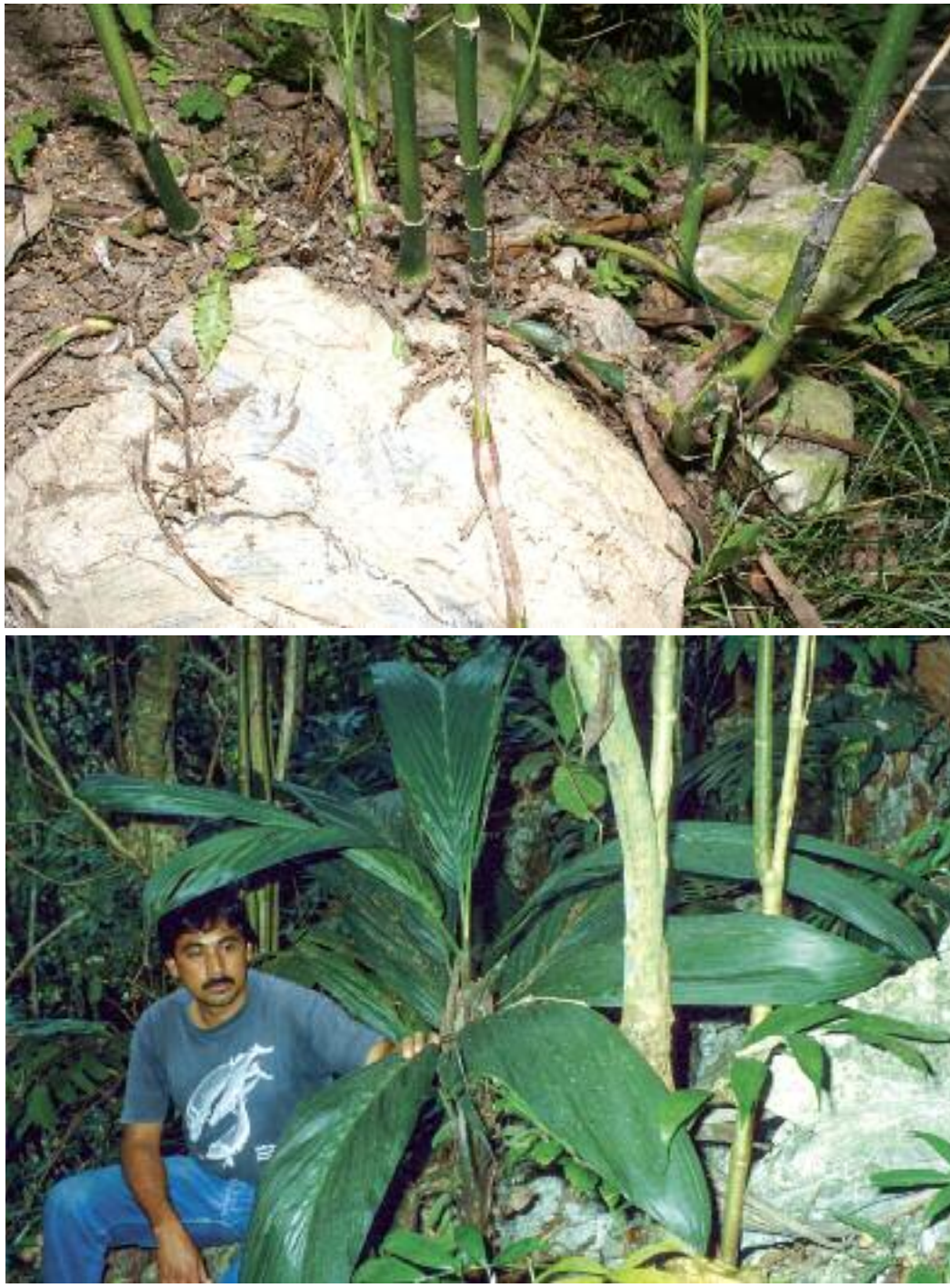
long and six meters wide. Its rhizomes and method of spreading or colonizing are remarkable. From a vertical "mother" stem several rhizomes radiate underground to two meters or more away, each giving rise to a new vertical stem that will in turn form new rhizomes that again spread in all directions, repeating the process indefinitely. Perhaps this rhizomatous habit is an adaptation for survival among the large rocks and steep, shifting, decomposed granite substrate (Fig. 18).

Because all the rhizome pieces I collected in 1989 for the *Chamaedorea* Research Collection grew into staminate plants, I believe that they were all from an extensive, wide-spreading colony of a single plant. This colony was at least 10 meters wide. Unfortunately, pistillate flowers and fruits are unknown for *Chamaedorea rhizomatosa*, but because of its vigorous growth, I have been able to make divisions of the rhizomes and share the species with growers, collectors and gardens in southern California and Australia.

17. *Chamaedorea rhizomatosa* is a vigorous grower in the Chamaedorea Research Collection, producing 12 stems to three meters tall, numerous smaller stems, and spreading to cover an area about three meters long and six meters wide (*Hodel 936 bis*).

Another remarkable species of *Chamaedorea* that deserves attention because it has performed so well in the *Chamaedorea* Research Collection is a unique simple-leaved form of the typically pinnate-leaved, climbing and vining *C. elatior*. Of the several distinct forms of *C. elatior*, the most common and widespread one, which occurs on the Pacific slope of Chiapas, Mexico and Atlantic slopes of Guatemala, Honduras and México, has a solitary, moderately robust stem with strongly reflexed, hook-like pinnae. Although having pinnate leaves as an adult, this form has large, simple and bifid juvenile leaves. A second form of *C. elatior*, which occurs less frequently on the Atlantic slope in México and typically at higher elevations, is cespitose and has pinnate leaves with softer, more weakly reflexed terminal pinnae and slender stems that branch at the base and as much as a meter or more above the ground. A third form on the Pacific slope of Guatemala is solitary with robust, long stems and leaves, the latter of which are noteworthy for their length and great number of long, narrow, straight, grass-like pinnae. These last two forms have pinnate leaves during late juvenile stages, but I am unaware if they have simple leaves during early juvenile stages.

In early 1993, Inge Hoffmann, Juan José Castillo and I observed a fourth form of *Chamaedorea elatior* on jagged, razor-sharp limestone rocks at low elevation in Veracruz near the border with Oaxaca on the isthmus of Tehuantepec in México (Hodel & Castillo-Mont 1995). Ed Carlson and Loran Whitelock, plant aficionados in southern California who had encountered this unusual form with huge, simple and bifid leaves and apparently non-climbing stems in 1992, felt it was a new species of *Chamaedorea* and had tipped me off about its whereabouts. While I suspected it might be a form of *C. elatior*, Ed and Loran were adamant that it was not. Nonetheless, Inge, Juan José and I found this most unusual and striking *Chamaedorea* in wet, lowland forest where it was rather abundant and conspicuous on great, jumbled, limestone rocks (Fig. 19). The uneven, sometimes shifting, exceedingly sharp rocks, riddled with obscured sink holes and shafts, made exploring the site tedious and dangerous. This striking plant has a robust rosette of meter-long, simple and bifid leaves and reminds one in habit of some of the other, better known, neotropical simple-leaved palms like *Asterogyne martiana*, *Calyptrogyne ghiesbreghtiana* and *Geonoma* spp.



18 (top). The creeping, rhizomatous habit of *Chamaedorea rhizomatosa* might be an adaptation for survival in a rocky habitat (*Hodel 936 bis*, cultivated, *Chamaedorea* Research Collection). 19 (bottom). Juan José Castillo provides scale for this most unusual and striking, simple-leaved form of *Chamaedorea elatior* in wet, lowland forest in Oaxaca, Mexico (*Hodel 1169*).

We surveyed about 150 plants in the area and, while they were flowering and fruiting with their huge, simple leaves and showing no inclination to climb, we eventually discovered a few, simple-leaved plants that had the newest leaf or two showing a pinnate blade with the reflexed, hook-like pinnae typical of *C. elatior*. A close examination of flowers and fruits

20. Marianne Hodel stands with a fruiting plant of the dramatic, simple-leaved form of *Chamaedorea elatior* that, after five years, is just beginning to hint at its climbing nature (*Hodel 1170 bis*, cultivated, *Chamaedorea* Research Collection).

showed that this plant with simple adult leaves was, indeed, *C. elatior*, albeit a highly unusual form.

Plants grown from seeds collected at the site and now in the *Chamaedorea* Research Collection flower and fruit with these huge, striking, simple leaves and have produced multiple generations over the last 20 years (Fig. 20). However, after about five years of producing these large, spectacular leaves and about one to two years after flowering and fruiting, they soon disappoint, producing increasingly elongated internodes and pinnate leaves with reflexed, hook-like pinnae, and the heavy, intractable plant begins to climb. Nonetheless, for a few years this most unusual but striking and handsome plant, which sustained no damage during the January 2007 freeze and has proven hardy and easy to grow outdoors in subtropical regions like southern California, would make an excellent substitute for the tropical, more tender species of *Asterogyne*, *Calyptrogyne*, *Geonoma*, *Hydriastele* and *Iguanura*, which are much celebrated and sought after for their handsome simple leaves yet are difficult, if not impossible to grow in arid and/or subtropical climates.

Conclusion

Nearly all the newly developed information in *Chamaedorea* over the 20 years since *CP* was published has enlightened and enriched our understanding of this remarkable group of palms. Sadly, habitat destruction and zealous collecting have pushed several species to extinction or nearly so. I am often asked if there are new discoveries waiting to be made in *Chamaedorea*. I believe the answer is yes, and I look forward to the time when I can review the new collections that botanical institutions, like the Missouri Botanical Garden, have made over the last 20 years. Perhaps I shall be pleasantly surprised and rewarded with a species or two that is new to science.

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