A New Nothospecies and Two Cultivars for the Hybrid in Cultivation between *Chamaedorea microspadix* and *C. radicalis* (Arecaceae)

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The artificial hybrid and its two cultivars presented and discussed here between *Chamaedorea microspadix* and *C. radicalis*, while intentional or not, have occurred in at least the last 50 years in two combinations, each the inverse of the other: 1) C*. microspadix* as the pistillate or seed parent and *C. radicalis* as the staminate or pollen parent; 2) *C. radicalis* as the pistillate or seed parent and *C. microspadix* as the staminate or pollen parent. Regardless of which is the pistillate or staminate parent, according to the rules of botanical nomenclature governing hybrids, both are included in the same artificial hybrid species.

Thirty years ago, in my monograph *Chamaedorea Palms* (Hodel 1992), among the hybrids I briefly noted was one of the many that the late Richard Douglas produced in his garden in Walnut Creek, California. Although Douglas intentionally made many hybrids in *Chamaedorea*, he noted that the one between a staminate *Chamaedorea radicalis* and a pistillate *C. microspadix* was inadvertent and spontaneous. I gave this hybrid the cultivar name *Chamaedorea* 'Alan Bredeson' in honor of the late International Palm Society, Palm Society of Southern California, and Hawaii Palm Society member Alan Bredeson in whose garden in Lemon Grove, California near San Diego I had observed it in 1988. Unfortunately, at the time, I did not provide a hybrid species name, description, or illustration of this newly named hybrid, noting only that it was of clustering habit like its pistillate parent and had leaves and inflorescences that were intermediate between both parents.

What prompted this present study and paper is another inadvertent hybrid, this time between a pistillate *Chamaedorea radicalis* and a staminate *C. microspadix* that occurred spontaneously in my home garden (Chamaedorea House) in Lakewood, California. The *C. radicalis* and the *C. microspadix* are growing against my home and about 10 m distant from each other. Although they both always produce fruits with fertile seeds, *C. radicalis* does so prodigiously, resulting in many offspring naturally arising in the garden, while *C. microspadix* does so less frequently. About two years ago, a group of close-spaced individuals about one meter from a *C. radicalis* (about an inflorescence length away) caught my attention because they begin to grow vigorously and their stems elongated quickly (**Fig. 1**). In addition to their well developed, above-ground, elongate stem, which is atypical for *C. radicalis* but typical for *C. microspadix*, they had leaves that were

1. *Chamaedorea* × *microcalis* 'Claire', shows solitary habit with an elongate stem and a staminate inflorescence, holotype, *Hodel 4011*. All photos at the Hodel garden, Chamaedorea House, Lakewood, CA, unless noted otherwise.

intermediate between *C. radicalis* and C*. microspadix*, leading me to believe that they were hybrids between these two species and had originated from one infructescence of *C. radicalis* that had dropped its fruits just below the plant. Both staminate and pistillate plants attained maturity rather quickly, producing ample inflorescences, flowers, and fruits, enabling me to describe this hybrid and another one of its cultivars in detail.

Here, I name and describe the hybrid between *Chamaedorea microspadix* and *C. radicalis*, providing a hybrid species name and a second cultivar name for distinct offspring.

Chamaedorea × microcalis Hodel **nothospec. nov.** (*C. microspadix* Burret × *C. radicalis* Mart.). Type: CULTIVATED. U. S. A., California, Los Angeles County, Lakewood, Chamaedorea House, garden of Marianne A. and Donald R. Hodel, 17 March 2022, *D. R. Hodel 4011* (staminate) (holotype LASCA, isotype BH). **Figs. 1–16.**

I collected the type material on the same date from the same plant and it consists of multiple sheets, each with the same label and information, including collection number, locality, and description, and each sheet is numbered sequentially and clearly identified as part of the same collection.

Table 1. Comparison of distinguishing characters of C*hamaedorea* × *microcalis* and its parents C*. microspadix* and *C. radicalis*.

Character	*C. microspadix*	*C.* × *microcalis*	*C. radicalis*
habit	clustered	solitary or clustered	solitary
stem	elongate, 1 cm diam.	elongate, 2.5–3.5 cm diam.	very short, rarely elongate, 2.5–3 cm diam.
leaf base	tubular, papery	tubular, obliquely to long-open apically, papery to leathery	long-open, deeply split, thick, leathery
pinnae	7–9 per side, lanceolate, sigmoid	9–16 per side, lanceolate, straight	10–20 per side, linear-lanceolate, straight
peduncle	10–21	30–100 cm	100–170 cm
peduncular bracts	4–5, to 16 cm long	6–7, to 30.5 cm long	6–10, to 42 cm long
flowers			
staminate	creamy white	yellowish green	green
pistillate	yellowish	yellowish	green

2. Leaves and staminate and pistillate inflorescences of *Chamaedorea microspadix* (left), *C.* × *microcalis* 'Claire' (center, leaf and staminate inflorescence the holotype, *Hodel 4011*; pistillate inflorescence *Hodel 4012*), and *C. radicalis* (right). Ruler = 90 cm.

Diagnosis: *Chamaedorea* × *microcalis* displays a range of characters intermediate between both parents, especially in pinnae quantity, shape, and size and inflorescence size (**Figs. 2–4**). Offspring of staminate *C. microspadix* and pistillate *C. radicalis* are solitary while offspring of pistillate *C. microspadix* and staminate *C. radicalis* are clustered. Flowers vary somewhat, especially in color and, to some extent, in shape. Staminate flowers of *C.* × *microcalis* are more similar in shape to those of *C. radicalis* but are yellowish green rather than green while pistillate flowers are intermediate in shape between the two parents but yellowish like in *C. microspadix* rather than green as in *C. radicalis* (**Fig. 5**). **Table 1** summarizes the primary distinguishing characters of *C.* × *microcalis* and its parents *C. microspadix* and *C. radicalis*.

3. Leaves of *Chamaedorea microspadix* (left), *C.* × *microcalis* 'Claire' (center, the holotype, *Hodel 4011*), and *C. radicalis* (right).

Small, solitary or clustered, pinnate-leaved, dioecious, pleonanthic palms. Stems elongate, 2.5–3.5 cm diam., green where exposed, yellowish where covered by persistent dead leaf sheaths, ringed, internodes 10–25 cm. Leaves 4–7, spreading to arching; leaf bases 20–41 cm long, tubular, obliquely open to deeply split apically; petioles 19–30 cm long; rachises 57–85 cm long; pinnae 9–16 per side of the rachis, regularly arranged, alternate to subopposite, largest in lower middle blade, these 25–41 × 2.5–4 cm, lanceolate, straight, long-acuminate, dark green adaxially, midrib prominent adaxially. Inflorescences 3–4, erect spreading; peduncles 30–100 cm long; staminate rachis 5–10 cm long; rachillae 4–10, 15–28 cm long, spreading to drooping; pistillate rachis 1–3 cm long; rachillae 3–4, to 26 cm long. Staminate flowers 3 × 3 mm, yellowish green; pistillate flowers 3.8 × 2.8 mm, ovoid, yellowish. Fruits 12–14 × 10–12 mm, red-orange.

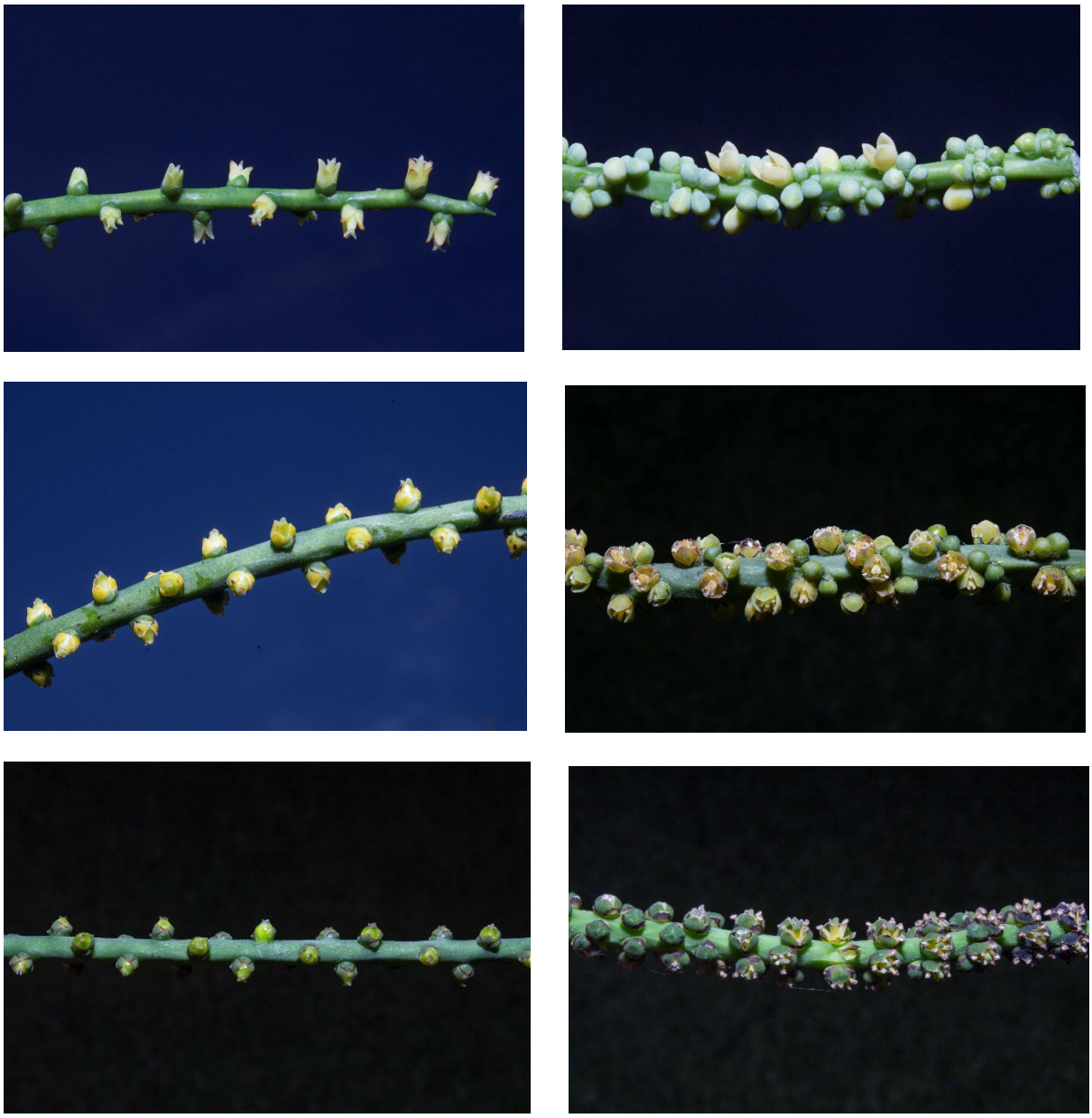
The two cultivars of *Chamaedorea × microcalis* can be distinguished in the following key.

4. Staminate and pistillate inflorescences of *Chamaedorea microspadix* (left three), *C.* × *microcalis* 'Claire' (center two, staminate inflorescence the holotype, *Hodel 4011*; pistillate inflorescence *Hodel 4012*), and *C. radicalis* (right three). Ruler = 90 cm.

Key to the Cultivars of *Chamaedorea* × *microcalis*

Plants clustering; pinnae nine on each side of the rachis; inflorescences less than 50 cm long . . . . . '**Alan Bredeson'**

Plants solitary; pinnae 14–16 on each side of rachis, inflorescences 75–100 cm long . . . . '**Claire**'



5. Pstillate (left) and staminate (right) flowers of *Chamaedorea microspadix* (top), *C.* × *microcalis* 'Claire' (center, staminate the holotype, *Hodel 4011*; pistillate *Hodel 4012*), and *C. radicalis* (bottom).

Chamaedorea × *microcalis* 'Alan Bredeson' Fig. 6.

I gave this selection of the hybrid the cultivar name 'Alan Bredeson', in honor of the late palm collector and grower Alan Bredeson in whose California garden I observed it in 1988 (Hodel 1992). **Figure 6** fixes or establishes this cultivar and is the basis for the description.

6. *Chamaedorea* × *microcalis* 'Alan Bredeson', type plant, showing its clustered habit and relatively short inflorescences. Garden of the late Alan Bredeson, Lemon Grove, CA, 1988.

Small, clustered, erect to leaning, palm 1–3 m tall. Stems 2.5 cm diam., green where exposed, yellowish where covered by persistent dead leaf bases, ringed, internodes 10 cm. Leaves 4–5, spreading to arching; leaf bases 20–30 cm long, tubular, obliquely open apically; petiole 25 cm long; rachis 70 cm long; pinnae 9 per side of the rachis, regularly arranged, alternate to subopposite, largest in lower middle blade, these 25–30 × 2.5–3 cm, most distal pair conspicuously larger, to 6 cm wide, lanceolate, straight, long-acuminate, glossy dark green adaxially, midrib prominent adaxially. Inflorescences 3–4, erect spreading; staminate peduncle 30 cm long; rachis 5 cm long; rachillae 4, 15–20 cm long, spreading to drooping; pistillate not seen.

Chamaedorea × *microcalis* 'Claire' Figs. 1–5, 7–16.

I have given a selection of this hybrid the cultivar name 'Claire', in honor of my newly born granddaughter Claire Wu Hodel, whose presence coincided with my recognition of this hybrid and showed that delightful, little treasures can come in small packages. The type for the hybrid fixes or establishes this cultivar and is the basis for the description.

7. *Chamaedorea* × *microcalis* 'Claire', the two tall specimens rising above the surrounding *C. radicalis*. Plant on the left is staminate, the holotype, *Hodel 4011*, and that on the right is pistillate, *Hodel 4012*.

8. Stem of *Chamaedorea* × *microcalis* 'Claire' showing relatively long, smooth, green internodes, the holotype, *Hodel 4011*.

9. Leaf and inflorescence of *Chamaedorea* × *microcalis* 'Claire'. Leaf and staminate inflorescence the holotype, *Hodel 4011*. Pistillate inflorescence *Hodel 4012*. Ruler = 90 cm.

10. Ligule of *Chamaedorea* × *microcalis* 'Claire' at apex of leaf sheath. Left, the holotype, *Hodel 4011*; right *Hodel 4012*.

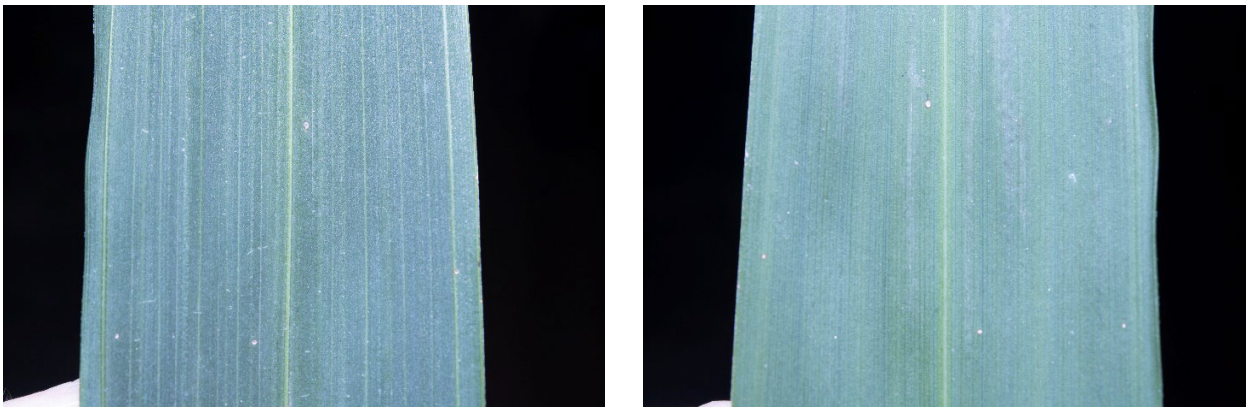
Small, solitary, erect palm 2–4 m tall (**Figs. 1, 7**). Stem 3–3.5 cm diam., green where exposed, yellowish where covered by persistent dead leaf sheaths, ringed, internodes 20–25 cm (**Fig. 8**).

Leaves 5–7, ascending to spreading, pinnate (**Figs. 1–3, 7, 9, 11**); leaf bases 36–41 cm long, deeply split apically, tubular basally, initially green and obscurely nerved with a slight glaucous bloom abaxially, aging and drying tan to brown, thick, leathery, longitudinally striate-nerved with a raised and prominent extension of petiole and numerous prominent nerves on either side, copper-colored adaxially with prominent nerves, a low, collar or flange-like, greenish yellow ligule distally on either side of the petiole 5–7 mm high (**Fig. 10**); petiole 19–30 cm long, 10 × 10 mm at base, 8 × 8 mm at apex, rounded abaxially, flat adaxially and there shallowly grooved toward base, green and with a slight glaucous bloom when fresh, when dry prominently sulcate adaxially and laterally nerved; rachis 57–85 cm long, attenuate, 1.5 mm diam. at apex, rounded abaxially, angled adaxially, green and with a slight glaucous bloom when fresh; 14–16 pinnae per side of the rachis (**Figs. 1–3, 7, 9, 11**), regularly arranged, opposite to subopposite, largest in lower middle blade, these 29–41 × 4 cm, most proximal 20–26 × 1.8–2.5 cm, most distal 14–15 × 2–2.7 cm, lanceolate, straight, long-acuminate, tips curled under, base contracted, thick-papery nearly leathery, dark green adaxially, slightly paler abaxially, prominent and raised midrib and submarginal nerves adaxially (**Fig. 12**), 1–3 prominent primary nerves between midrib and submarginal nerve, nerves of lesser orders numerous, faint, only midrib and submarginal nerves conspicuous and slightly raised abaxially (**Fig. 12**), midrib slightly rough-textured.

Inflorescences several, interfoliar, erect-ascending in flower, nodding in fruit; peduncles 75–100 cm long (**Figs. 1–3, 9, 13**), flattened and 1.8–2 cm wide and 7–8 mm thick at base, green where exposed; prophyll 8.5 cm long and attached 1.5 cm from base, peduncular bracts 6–7, 1st peduncular bract 12.5–13 cm long, 2nd 18–20 cm long, 3rd 22.5–24.5 cm long, 4th 26–28 cm long, 5th 23–30.5 cm long, 6th to 26.5 cm long, 5th or 6th bract extending on to rachis and sometimes concealing a 6th or 7th small bract to 1.5–5.5 cm long, tightly imbricate, bifid apically, longitudinally striate nerved, green to tan in flower, tan in fruit; staminate with rachis 10 cm long, 12 × 6 mm at base, 7 × 4 mm at apex, angled; rachillae 10, 20–28 cm long (**Fig. 13**), 6 × 3 mm at base and flattened, 1.5–2.5 mm diam. at apex, spreading, green and minutely white punctate in flower; pistillate rachis 1–3 cm long; rachillae 3–4 (**Fig. 14**), to 26 cm long, 6 × 3 mm at base, 1 mm diam. at apex, initially erect to spreading and green and minutely white-spotted in flower, becoming spreading and dark brown to black in fruit, straight to slightly curved, rigid, most proximal subtended by a green, long-triangular bract 8 mm long, 2nd most proximal subtended by a triangular, green bract 5 mm long.

Staminate flowers in up to 4-flowered mostly linear clusters or acervuli to 10 mm long (**Fig. 5**), these becoming 2-flowered distally, acervuli or flowers in elliptic pits 1.5–6 mm long; flowers at anthesis 3 × 3 mm, depressed globose, yellowish green; calyx 2.5 × 2.5 mm, crownlike, sepals 3,

11. Leaf blade of *Chamaedorea* × *microcalis* 'Claire', showing pinnae, the holotype, Hodel 4011.



12. Pinnae of *Chamaedorea* × *microcalis* 'Claire' showing nervation, the holotype, *Hodel 4011*. Left, adaxial surface; right, abaxially surface.

13. Staminate inflorescence of *Chamaedorea* × *microcalis* 'Claire' showing long peduncle and rachillae, the holotype, *Hodel 4011*.

connate in basal 1 mm, rounded apically, green, briefly black-margined; petals 3, 3–3.25 × 2.5–3 mm, broadly ovate, free to base, acute, green changing to greenish yellow; stamens 6, 2.75–3 mm high, about equaling pistillode, filament 2.5 × 0.5 mm, columnar, clear-colored; pistillode 3

14. Pistillate rachillae *Chamaedorea* × *microcalis* ‘Claire’, *Hodel 4012*.

15. Pistillate rachillae of *Chamaedorea* × *microcalis* 'Claire' showing red-orange fruits, *Hodel 4012*.

16. Seeds of *Chamaedorea* × *microcalis* 'Claire' showing u-shaped grooves, *Hodel 4012*.

× 1 mm, ca. equaling petals, columnar, tip truncate, clefted; pistillate flowers solitary (**Fig. 5**), slightly sunken in 2 spiraling rows, ca. 5 mm distant within a row, 3.8 × 2.8 mm, ovoid, yellowish; calyx 1.2 × 2.5 mm, crown-like, sepals 3, connate and/or imbricate in basal 0.6 mm, broadly rounded-triangular apically, green with brief clear to black margins; petals 3, 3 × 2.8 mm, broadly triangular, imbricate in basal 1/2, yellow; gynoecium 3.8 ×2.5 mm, ovoid, greenish yellow, styles mostly lacking, stigma lobes short but distinct, rounded-triangular, erect to slightly flared outwardly, white-tipped.

Fruits 12–14 × 10–12 mm, ellipsoid-globose, reddish orange (**Fig. 15**); seeds 10–11 × 8–9 mm., ellipsoid-globose, dark gray with two u-shaped longitudinal grooves (**Fig. 16**).

Additional Specimen Examined. CULTIVATED. U. S. A., California, Los Angeles County, Lakewood, Chamaedorea House, garden of Marianne A. and Donald R. Hodel, 17 March 2022, *D. R. Hodel 4012* (pistillate) (LASCA, BH).

Discussion

The appearance of *Chamaedorea* × *microcalis* in the garden at Chamaedorea House prompted me to return to what I had written about *Chamaedorea* hybrids in my monograph of the genus 30 years earlier (Hodel 1992). Then I remarked that Chamaedoreas likely will hybridize on their own in cultivation only infrequently. This notion is mostly still true although, of course, obvious exceptions exist, like the hybrid under discussion here, which is between two closely related species in subgenus *Moreniella* of *Chamaedorea*. Indeed, the remainder of Douglas's numerous hybrids listed in Hodel (1992) were intentional, and I have yet to notice any other hybrids produced at Chamaedorea House, where several, often closely related species are growing adjacent to each other. Only one other hybrid I had listed, *Chamaedorea* 'Heidi Bornhorst', was probably inadvertent or unintentional.

I also noted that when a species with clustered or cespitose solitary crossed with a species of solitary habit, offspring are typically solitary stemmed, indicating that the genes controlling the solitary stemmed habit were likely dominant. Although a limited sample size, this notion has held true for three of the four simple and complex hybrids where the clustered *Chamaedorea microspadix* was one of the parents and in two hybrids involving the clustered *C. stolonifera*, the latter with closely related species in subgenus *Eleutheropetalum*; indeed, the clustered habit of the latter species was the very reason for including it as one of the parents but, unfortunately, it did not pass on the clustered habit to its offspring.

With *Chamaedorea* × *microcalis*, the results have been mixed; *C.* × *microcalis* 'Alan Bredeson' is of clustered habit while *C.* × *microcalis '*Claire' is of solitary habit. Although a small sample size, perhaps gender played a role, at least in this hybrid, because the pistillate or seed-bearing parent of the clustering *C.* × *microcalis* 'Alan Bredeson' is the clustering *C. microspadix* while the pistillate parent of the solitary *C.* × *microcalis* 'Claire' is the solitary *C. radicalis*. In the other simple and two other complex hybrids involving the clustering *Chamaedorea microspadix* and the solitary *C. radicalis*, the former was always the staminate parent and the latter was the pistillate parent, and the hybrids all have solitary habit. This interesting phenomenon requires molecular studies to confirm if habit is gender linked in this hybrid. Strangely, the two hybrids with the clustering *C. stolonifera* as the pistillate parent have solitary habit.

While I have had no experience cultivating *Chamaedorea* × *microcalis* 'Alan Bredeson', I have had extensive, if not intimate, experience with *C.* × *microcalis* 'Claire'. This latter cultivar shows hybrid vigor and is easily one of the fastest and most vigorous growers, faster than either parent and is likely the fastest of all *Chamaedorea* at Chamaedorea House. It has attained over two meters in height in the less than two years since stem formed. Both its parents are the most cold-hardy species in the genus; *C. radicalis* can tolerate temperatures of -5 to -7 C and *C. microspadix* can

tolerate -2 to -4 C, both without leaf damage, and both can survive even lower temperatures with leaf damage. At Chamaedorea House, 'Claire' has experienced near freezing temperatures the last several winters with no leaf damage, of course, and continues to grow vigorously through the winter. Both parents of 'Claire' can also tolerate high-light situations, with *C. radicalis* able to grow in nearly full sun in the San Gabriel Valley near Los Angeles where summer daytime temperatures are frequently above 32 C. At Chamaedorea House 'Claire' is under a west-facing house overhang with hot, late-afternoon sun and has tolerated 38 C with no damage. Also, both parents grow naturally on calcareous rocks or substrate in their native range in northeastern Mexico; thus, 'Claire' is likely also tolerant of such calcareous situations.

Because it is a solitary plant, Chamaedorea × *microcalis* 'Claire' would be effective in a mass planting in shade, high light, or nearly full sun, especially in cooler, more humid coastal areas where its handsome dark green leaves with curled under pinnae tips could be displayed to best advantage. Although it will grow fast, perhaps becoming tall and lanky rather quickly, this habit can be ameliorated by letting fruits drop to the ground and germinate under the parents, allowing a new generation and eventually multiple generations to arise, creating an interesting motif of staggered heights and unusual textures to the planting.

Acknowledgements

I sincerely thank Allen Coombes for help with understanding the nomenclature of cultivated plants.

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