

# *Chamaedorea tacanensis*: A Climbing Species from Mexico and Guatemala

MIGUEL ANGEL PÉREZ-FARRERA<sup>1</sup>, JOSÉ SAID GUTIÉRREZ-ORTEGA<sup>2</sup>  
AND DONALD R. HODEL<sup>3</sup>

Recently, *Chamaedorea tacanensis*, the second climbing species in the genus, was identified and named (Pérez-Farrera et al. 2021). Here we provide an illustrated account of this newly named species and discuss its discovery, confirmation of its status as a new species, distribution and ecology, conservation, and how it differs from *C. elatior*, the other climbing species in the genus.

One of the rarest growth forms in *Chamaedorea*, and perhaps the most unusual across the palm family in general, is the climbing, vine-like habit. Until recently, only one species in the genus, the variable *C. elatior*, was documented as a climber (Fig. 1). However, in the last few years, a second climbing species in the genus was identified on the Pacific slope of southern Mexico and Guatemala in the vicinity of the great Volcán Tacaná, which straddles the border of the two countries.

During a floristic inventory in the El Tacaná Biosphere Reserve from 2012 to 2015, which the Mexican government's National Commission for the Knowledge and Use of Biodiversity (CONABIO) financed, a team from the Eizi Matuda Herbarium, Institute of Biological Sciences, University of Sciences and Arts of Chiapas (UNICACH,) discovered and collected several samples of a climbing *Chamaedorea* (Fig. 2) growing in a moist mountain forest that at first glance seemed to correspond to *Chamaedorea elatior*.

However, further searches and field investigations and analyses showed that this new discovery had glaucous emerging petioles (Fig. 3) and finely divided pinnate leaves as a juvenile (Fig. 4), making it appear more like a juvenile *Chamaedorea glaucifolia*. These characters are in sharp contrast to the simple and bifid leaves of juvenile *C. elatior*. Later, in December 2014, co-authors Pérez-Farrera and Hodel conducted field work on the slopes of Volcán Tacaná in Chiapas, where they studied the morphology of this unusual climbing taxon in greater detail, enabling them to discern and appreciate some significant

<sup>1</sup>Laboratorio de Ecología Evolutiva, Herbario Eizi Matuda, Instituto de Ciencias Biológicas, Universidad de Ciencias y Artes de Chiapas, Tuxtla Gutiérrez 29039, Mexico  
perezfarreram@gmail.com

<sup>2</sup>Institute for Excellence in Educational Innovation, Chiba University, Chiba 263-8522, Japan  
josesgo@gmail.com

<sup>3</sup>University of California, Cooperative Extension, 700 W. Main St., Alhambra, CA 91801, U.S.A.  
drhodel@ucanr.edu

**Table 1. Some morphological and ecological differences between the two climbing species, *Chamaedorea elatior* (solitary form) and *C. tacanensis*.**

Character	<i>C. elatior</i>	<i>C. tacanensis</i>
Stem diameter (cm)	1.5–2	5.2–8.4
Leaf blade seedling and juvenile state	Simple, bifid	Pinnate
Emerging petiole indumentum	Glabrous	Glaucous
Petiole length (cm)	0–30	13–70
Leaf blade length (cm)	50–150	170–245
Quantity of pinnae on each side of rachis	10–35	42–60
Pinnae length (cm)	15–35	26–48
Pinnae width (cm)	2.5–5	1.8–3
Pinnae shape	Lanceolate	Linear to linear-lanceolate
Peduncle length (cm)	10–20	20–50
Prophyll length (cm)	Up to 10	1.5–3
Inflorescence rachis length (cm)	5–25	20–50
Quantity of staminate rachillae	Up to 35	Up to 50

differences with *C. elatior* (Table 1). For example, the newly discovered climbing taxon had larger stems, longer leaf blades, more pinnae, linear to linear-lanceolate pinnae (rather than lanceolate), proximal pinnae strongly reflexed (rather than weakly reflexed to spreading), middle pinnae plumose (rather than in the same plane), distal pinnae irregularly inserted (rather than regularly), longer inflorescences, a shorter prophyll, and many more staminate rachillae than *C. elatior*.

These substantial differences suggested that this newly discovered, climbing taxon could be a new species. Molecular data using two, low-copy nuclear DNA regions (RPB2 and PRK genes), which Thomas et al. (2006) and Cuenca and Asmussen-Lange (2007) had used in their studies, confirmed its status as a new species. Pérez-Farrera et al. (2021) described and named it *Chamaedorea tacanensis* in honor of Volcán Tacaná where it was discovered and first documented. The molecular data showed that *C. tacanensis* and *C. elatior* form separate monophyletic groups, suggesting that the climbing habit might have originated twice in the genus although more work is needed to confirm this hypothesis. It also showed that they share a common ancestor with several related species in the “Elatior” clade, a branch

of the phylogenetic tree that includes well known species such as *C. elatior*, *C. frondosa*, *C. geomiformis*, *C. glaucifolia*, *C. klotzschiana*, *C. oblongata*, *C. pochutlensis* and *C. tenella*, among several others. This clade is mostly congruent with the “Klotzschiana” clade of Thomas et al. (2006) and the “D” clade of Cuenca and Asmussen-Lange (2007).

*Chamaedorea tacanensis* is a solitary, slender, climbing, understory palm to 8 m tall or long, with a rather robust stem 5.2–8.4 cm diameter (Figs. 5–10). It typically holds 6–14, spreading, arching, long-pinnate leaves, which are pinnate even as seedlings (Fig. 6). Leaf sheaths are to 60 cm long and persistent on the stem. Emerging petioles are covered with a glaucous bloom (Fig. 3) and typically reach 13–70 cm long. Leaf blades are 170–245 cm long and hold 42–60 pinnae on each side of the rachis (Fig. 5). In pre-adult leaves pinnae are linear, spreading, not much reflexed, and mostly in the same plane. In adult leaves pinnae are mostly linear to linear-lanceolate, the largest 26–48 cm long and 1.8–3 cm wide, straight, sub-opposite to alternate and reflexed proximally, sub-opposite to alternate and spreading to reflexed and plumose mid-blade (Fig. 7), spreading and opposite distally where they are strongly indurate-calloused at the very



1. Until recently, the only climbing species in the genus *Chamaedorea* was *C. elatior*, as here on limestone at Temazcal, Veracruz, Mexico, *Hodel* 921. Note the lanceolate pinnae. Photo by D.R. Hodel.



2. At first glance *Chamaedorea tacanensis* appears similar to *C. elatior*. Chiquihuite, Volcán Tacaná, Chiapas, Mexico. Photo by D.R. Hodel.



3. *Chamaedorea tacanensis* has glaucous emerging petioles. Photo by M.A. Pérez-Farrera.

narrow attachment and become progressively but weakly downward-pointing, spreading to reflexed, and hooklike.

Inflorescences are interfoliar, breaking through the persistent or deteriorating leaf sheaths and have peduncles 20–50 cm long. Peduncles are clothed in 5–7, tubular, stout, brown bracts

with the prophyll 1.5–3 cm long and the most distal peduncular bract 8–19 cm long. Staminate inflorescences have a rachis 20–50 cm long and with up to 50, simple, green, spreading rachillae to 27 cm long (Fig. 8). Pistillate inflorescences are somewhat smaller, with a rachis 5–11 cm long and 10–20, rigid



4. Juvenile plants of *Chamaedorea tacanensis* have finely divided, pinnate leaves. Chiquihuite, Volcán Tacaná, Chiapas, Mexico. Photo by D.R. Hodel.



5. A plant of *Chamaedorea tacanensis* extracted from the forest to show its distinctive leaf morphology that gives it the climbing nature. Photo by M.A. Pérez-Farrera.

rachillae 8–22 cm long, these green in flower and black in fruit. The greenish yellow to bright yellow, strongly aromatic staminate

flowers have the lightly nerved petals connate basally and adnate apically to the pistillode and the corolla opening by lateral slits (Fig.

6. Seedling leaves of *Chamaedorea tacanensis* are pinnate. Chiquihuite, Volcán Tacaná, Chiapas, Mexico. Photo by D.R. Hodel.





7 (top). In adult leaves of *Chamaedorea tacanensis*, mid-blade pinnae are mostly linear to linear-lanceolate, straight, and sub-opposite to alternate and spreading to reflexed and plumose. Aguacaliente, Barrio a Laguna, Volcán Tacaná, Chiapas, Mexico. 8 (bottom). Inflorescences of *Chamaedorea tacanensis* are interfoliar, breaking through the persistent or deteriorating leaf sheaths and have peduncles 20 to 50 cm long. The staminate here has up to 50, simple, green, spreading rachillae to 27 cm long. Chiquihuite, Volcán Tacaná, Chiapas, Mexico. Photos by D.R. Hodel.



9. The greenish yellow to bright yellow, strongly aromatic staminate flowers of *Chamaedorea tacanensis* have the lightly nerved petals connate basally and adnate apically to the pistillode and the corolla opening by lateral slits. Chiquihuite, Volcán Tacaná, Chiapas, Mexico. Photo by D.R. Hodel.

9). The yellow pistillate flowers are followed by globose, black fruits 7–11 mm diameter and with a slight glaucous bloom.

*Chamaedorea tacanensis* is restricted to the slopes of Volcán Tacaná in Chiapas, Mexico and adjacent San Marcos in Guatemala, where it occurs as an understory element in tropical montane cloud forest at 1200–1900 m elevation. Several species of *Quercus* (oak) dominate this vegetation type, which can reach 35 m tall. It occurs on granitic substrates in Mexico and well-structured clays in Guatemala. It flowers from December to February and fruits from March to May. Hodel (1992a) included collections now recognized as *C. tacanensis* in the broadly circumscribed *C. elatior* (Fig. 10). Unfortunately, intact, undisturbed and unfragmented forest in the range of *C. tacanensis* is fast disappearing and, while we have no data, we suspect that this new species is threatened.

The description of *Chamaedorea tacanensis* implies that *C. elatior*, as currently circumscribed, might represent a group of lineages still defined under the same taxon. Hodel (1991, 1992a, 1992b) interpreted *C. elatior* as a broadly circumscribed and highly variable species incorporating solitary or clustered forms or populations, the latter of which sometimes branch aerially, and another form that has more than one-meter long, simple and bifid leaves into maturity, only after which does it begins to display its climbing habit (Hodel 2005, 2013, Hodel & Castillo-Mont 1995). Some of these various forms might be explained by elevation and/or substrate variation. For example, forms from Atlantic slope, lowland tropical rainforest are typically solitary, robust, and occur on limestone while forms from middle and higher elevation tropical montane cloud forest are slender and sometimes clustered and/or have

aerially branched stems and occur on clay soils derived from basalt. Further molecular, morphological, and ecological work is needed to tease out these differences and determine if these different forms of *C. elatior* represent separate species, as is the case of *C. tacanensis*.

#### LITERATURE CITED

- CUENCA, A. AND C.B. ASMUSSEN-LANGE. 2007. Phylogeny of the palm tribe Chamaedoreae (Arecaceae) based on plastid DNA sequences. *Systematic Botany* 32: 250–263.
- HODEL, D.R. 1991. The cultivated species of *Chamaedorea* with cespitose habit and pinnate leaves. *Principes* 35: 184–198.
- HODEL, D.R. 1992a. *Chamaedorea* Palms. The Species and their Cultivation. The International Palm Society, Lawrence, KS. 358 pp.
- HODEL, D.R. 1992b. *Chamaedorea*: diverse species in diverse habitat. *Bulletin de l'Institut Français d'Études Andines* 21: 433–458.
- HODEL, D.R. 2005. What's new in *Chamaedorea*. *Palm Journal* 182: 4–10.
- HODEL, D.R. 2013. *Chamaedorea* Palms 20 years after. *Palms* 57: 161–175.
- HODEL, D.R. AND J.J. CASTILLO-MONT. 1995. An unusual simple-leaved form of *Chamaedorea elatior*. *Palm Journal* 121: 27–33.
- PÉREZ-FARRERA, M.A., J.S. GUTIÉRREZ-ORTEGA, D.R. HODEL, D. VILLAR-MORALES, N.G. SANTOS-HERNÁNDEZ AND R. MARTÍNEZ-CAMILO. 2021. A new species of climbing *Chamaedorea* (Arecaceae) from Chiapas, Mexico. *Phytotaxa* 522: 94–108. <https://doi.org/10.11646/phytotaxa.522.2.2>
- THOMAS, M.M., N.C. GARWOOD, W.J. BAKER, S.A. HENDERSON, S.J. RUSSELL, D.R. HODEL AND R.M.

BATEMAN. 2006. Molecular phylogeny of the palm genus *Chamaedorea*, based on low-copy

nuclear genes PRK and RPB2. *Molecular Phylogenetics and Evolution* 38: 398–415.

10. Juan José Castillo-Mont holds a collection of *Chamaedorea tacanensis* (Hodel & Castillo-Mont 914) from San Marcos, Guatemala that was included as *C. elatior* in *Chamaedorea Palms* (Hodel 1992a).

