

Astrocaryum confertum, an Enigmatic Costa Rican Palm Rediscovered

GREGORY C. DE NEVERS,¹ MICHAEL H. GRAYUM, AND BARRY E. HAMMEL

Missouri Botanical Garden, Box 299, St. Louis, MO 63166

Reference to the palm now known as *Astrocaryum confertum* H. A. Wendl. ex Burret first appeared as an enigmatic note in Hemsley's *Biologia Centrali-Americani* (1885), an early compendium of Middle American biota. The reference reads "*Astrocaryum polystachyum* Wendl. ined?, Costa Rica, Rio Sarapiquí (Wendland) Hb. Kew." The name has never been validly published. Nonetheless, the name was taken up by Standley (1928), who saw neither the palm nor specimens. The Kew specimen was seen by Bailey (1933) who recognized it as distinct from *A. standleyanum* Bailey and put it aside for further study. In his monograph of the genus *Astrocaryum*, Burret (1934) described *Astrocaryum confertum* based on a Wendland collection and credited the name to Wendland. The holotype is not among Wendland's collections at GOET, and was presumably destroyed at B during World War II, along with most of Burret's material. The Kew specimen cited above is presumably an isotype. Its label lacks "Mai" and "Eingeborenennamen zurubre," data which are in Burret's original description and must have appeared on the label of the holotype.

Since the time of Burret *A. confertum* has been referred to in the literature by Dahlgren (1936), based on Burret (1934) and the questionable citation by Standley (1928), Loomis (1939), and Glassman (1972), based on Dahlgren. Standley

(1937) reports *A. confertum* from Costa Rica, but the description actually seems to refer to *A. alatum* Loomis ("plants 2-3 m, fruits globose, forming dense, pendent panicles"), a species not described until 1939. An herbarium search at A, BH, CAS, CR, DUKE, GH, F, K, MO, PMA and US has turned up no modern collections definitely referable to *A. confertum*. A photograph at BH taken by Langlois in 1945, of a palm from "between San Miguel and La Virgen," Costa Rica, is almost certainly *A. confertum*. Moore 6634 (BH), "between Corazon de Jesus and La Virgen, Prov. Heredia, Costa Rica," is probably *A. confertum*. It consists of juvenile leaves only, but the collection notes and the locality are indicative of *A. confertum*.

In recent literature, a tall spiny palm of the genus *Astrocaryum* from the wet lowlands of northeastern Costa Rica has been treated as *A. standleyanum* (Moore 1973, Hartshorn and Poveda 1983, Chazdon 1985). These reports are problematic to workers familiar with *A. standleyanum* from Panama or southwestern Costa Rica who have seen the *Astrocaryum* from northeastern Costa Rica. *A. standleyanum* has a long, pendant infructescence, whereas the infructescence of the northeastern Costa Rican plant is stiffly erect and much shorter. There is no voucher specimen of *A. standleyanum* or of *A. confertum* at BH or DUKE from the Atlantic slope of Costa Rica. While preparing a treatment of the palms for *Flora Costaricensis*, Grayum encountered the name *A. confertum*, based on a collection

¹ Current address: California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118.

from northeastern Costa Rica. With this background in mind, we recently searched the wet lowlands of northeastern Costa Rica to locate *Astrocaryum confertum* and verify that it is distinct from *A. standleyanum*.

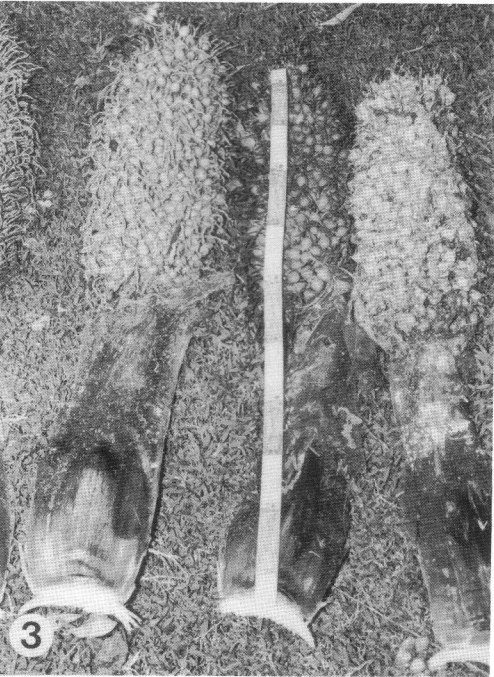
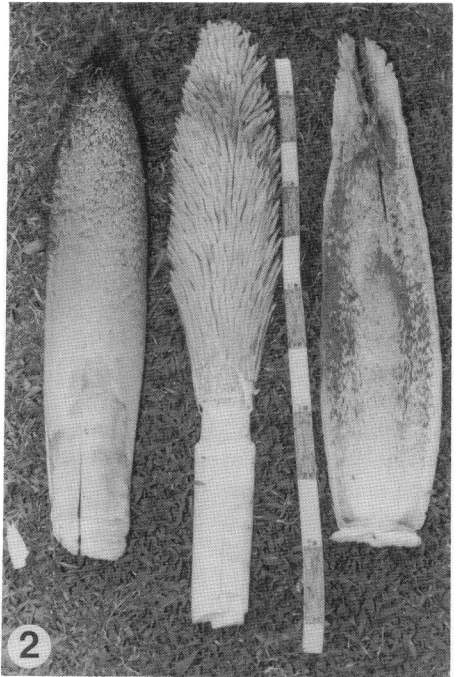
We observed *A. confertum* at Finca El Bejuco, near the type locality, but felt it inappropriate to collect such a massive plant on the tiny reserve. A suitable individual was located in the same region near La Virgen, a *campesino* was hired to cut the palm down, and *A. confertum* was collected for the first time in 129 years. *Astrocaryum confertum* was subsequently collected in Limon Province, Costa Rica, and San Blas, Panama. The palm is here fully described and illustrated (Figs. 1-4) for the first time based on the isotype from K and the three recent collections.

***Astrocaryum confertum* H. A. Wendl.**
ex Burret, Die Palmengattung *Astrocaryum*, Feddes Repert. Spec. Nov. Regni Veg. 35: 136-138, 1934. Type: Costa Rica, Heredia, along the Rio Sarapiquí, May 1857, *Wendland s.n.* Holotype ?B (destroyed); isotype K!

Astrocaryum polystachyum H. A. Wendl.
Biologia Centrali-Americani, Botany III, 414, 1885.

Stem solitary, 10.8-17.2 m tall to the lowest leaf base, 14-20 cm dbh, profusely spiny on the internodes, spines to 17 cm long. Leaves 5-12; sheath 55-60 cm long, 15-26 cm wide, 8 cm thick, spiny outside; petiole 70-80 cm long; rachis 290-350 cm long with 114-123 pinnae per side. Inflorescence interfoliar, straight, erect in flower and in fruit, closely appressed to the stem; peduncle 30-37 cm long from insertion of the prophyll to insertion of the peduncular bract; prophyll 10-11 cm wide at base, 16-17 cm wide at middle, 80-82 cm long; outer surface of prophyll brown with scattered, flattened black spines 15-20 mm long mixed with abundant 4-7 mm long brown, rather soft, hairlike spines;

inner surface of prophyll yellowish with scattered black spines and few brown spines; margins and apex paper thin; bract rotting away with age; peduncular bract 93-98 cm long, tapered to a thick, flattened point, 30 cm broad at center when open, mounted obliquely on the peduncle, heavily spiny in distal half, less so proximally; outer surface minutely brown-furfuraceous, clothed in flattened, black spines 6-43 mm long, also with round, white spines 3-9 mm long; inner surface smooth, white, waxy; rachillae numerous, 13-19 cm long, bearing triads of 2 staminate flowers and 1 pistillate flower in the proximal portion, and staminate flowers only in the distal portion; triad bearing portion of rachillae 6-9.5 cm long, densely hirsute with long unbranched trichomes; triads distant, subtended by 3 unequal bracts 5-10 mm long; staminate portion of rachillae 7-10 cm long, with axis elaborated into a continuous, glabrous, smooth green sheet in which staminate flowers are half immersed in bud; each staminate flower subtended by a narrow, flat, awl-shaped bract 4-6 mm long; bract filamentous at apex with capillary hairs; staminate flowers with 3 sepals, these long triangular, lacinate at the tip, united briefly at the base, 1.5-2 mm long, white to purple; petals 3, valvate, 4-6 mm long, purple in distal half, glabrous; stamens 6, filament 3-4 mm long, purple in distal half, white proximally; anthers versatile, united in upper half, free below, dehiscing introrsely, yellow and exerted from the petals at anthesis; pistillode minute, 3-lobed; staminate flowers of triads with 6 stamens, slightly smaller than the upper staminate flowers, possibly fertile; pistillate flowers white, the sepals and petals united into 2 concentric tubes; staminodial ring cup-shaped with purple rim, 1-2 mm deep, minutely 6-lobed; sepals 11-15 mm long, 4-6 mm wide, 3-lobed at apex, the lobes profusely and minutely lacinate; tube covered in flat brown, lanceolate hairs amid a tangle of arachnoid pubescence, finely vertically striate with-



1-4. *Astrocaryum confertum*, bars equal 10 cm., de Nevers & Hammel 7820. 1. Leaf, and epiphyte covered trunk. 2. L. to R., peduncular bract, young inflorescence, and prophyll. 3. Infructescences. 4. Leaf base.

out, the inner surface smooth; petals united, tubular, 11–15 mm long, the pubescence identical to that of the sepals, 3-lobed, the lobes lacinate; ovary elongate, 10–14 mm long, 3–4 mm wide at base, minutely pubescent; stigmas 3, 1–2 mm long, spreading; fruit orange, 3.3–3.7 cm long (including narrow, pointed stigmatic residue 4–7 mm long), 1.8–2 cm wide, minutely and impalpably spinescent; pulp sweet, fibrous, 2–3 mm thick; endocarp very hard, black, 1–1.3 mm thick; endosperm white, homogeneous; seed ovoid, 2.5 cm long, 1.5 cm wide.

Common Names: “zurubre” Costa Rica (Burret 1934); “coyolillo” Costa Rica, “pina-pina” Panama (Standley 1928); “coyolito” Costa Rica (Dahlgren 1936); “pejiballe de montana” Costa Rica (Stevens & Montiel 24624).

Specimens Examined: Costa Rica. Heredia: along the Rio Sarapiquí, 1857, *Wendland s.n.* (K! isotype); 5 km SW of La Virgen, 250 m, 10°23'N, 84°10'W, 4 June 1986, *de Nevers & Hammel 7820* (CAS, CR, MO). Limon: Cerro Coronel, E of Laguna Danto, 20–170 m, 10°41'N, 83°38'W, “pejiballe de montana,” 15 Sept. 1986, *Stevens & Montiel 24624* (CR, MO). Panama. Comarca de San Blas: Cerro Obu, 400 m, 9°23'N, 78°48'W, 24 June 1986, *de Nevers & Herrera 8000* (CAS, MO, PMA).

Astrocaryum confertum is known only from specimens from the Atlantic slope of Costa Rica and Panama, between 20 and 250 m. It is probably much more common than these meager gatherings indicate, but is rarely collected because of its size, armature and wet forest habitat. We suspect it will eventually be found to range from Nicaragua to the Colombian Chocó in wet forests of the Atlantic slope. Although *A. confertum* and *A. standleyanum* occur within a few kilometers of each other on the Atlantic slope of San Blas, Panama, they occur in different forest types: *A. standleyanum* in Tropical Moist Forest (Holdridge et al. 1971) and *A. confertum*

in Tropical Wet Forest. In Costa Rica *A. confertum* is known only from the Atlantic slope, and *A. standleyanum* only from the Pacific slope, both mainly in Tropical Wet Forest.

Astrocaryum confertum is broadly similar to *A. standleyanum* in habit, fruit, and the structure of the rachilla. *Astrocaryum alatum* Loomis and *A. mexicanum* Liebm. are distinctive in their shorter stature, the disposition of the pistillate flowers, staminodes adnate to the corolla, and longer spines of the fruits. The four Central American species of *Astrocaryum* can be separated using the following key:

1. Fruits leathery, unarmed or with small scalelike spines; pistillate flowers produced on rachillae, below the staminate flowers; main axis of inflorescence without flowers; plants 5–17 m tall; leaf bases cleanly deciduous, the trunks armed with rings of stout spines 2
2. Infructescence erect, straight; fruits 3.3–3.7 cm long, with small scalelike spines; seed 2.5 cm long; staminate flowers half sunken in the rachilla, stamens included *A. confertum*
- 2' Infructescence pendant, the peduncle recurved; fruits 4–4.6 cm long, glabrous; seed 3.2 cm long; staminate flowers not immersed, stamens exerted *A. standleyanum*
- 1' Fruits conspicuously armed; pistillate flowers produced on main axis of inflorescence, rachillae staminate; plants 1.5–6 m tall; leaf bases persistent or deciduous 3
3. Leaf bases deciduous, the trunk armed with stout spines; fruits broadest at center, gradually tapered to the tip *A. mexicanum*
- 3' Leaf bases persistent on the spineless trunk; fruits obovate, flat-topped, with persistent, apiculate stigma *A. alatum*

LITERATURE CITED

- BAILEY, L. H. 1933. Certain palms of Panama. *Gentes Herb.* 3: 86–89.
- BURRET, M. 1934. Die Palmengattung *Astrocaryum* G.F.W. Meyer. *Feddes Repert. Spec. Nov. Regni Veg.* 35: 136.
- CHAZDON, R. L. 1985. The palm flora of Finca La Selva. *Principes* 29: 74–78.
- DAHLGREN, B. E. 1936. Index of American palms. *Publ. Field Mus. Nat. Hist., Bot. Ser.* 14.
- GLASSMAN, S. F. 1972. A revision of B. E. Dahl-

- gren's index of American palms. Phanerogamarum Monographiae Tomus VI.
- HARTSHORN, G. S. AND L. J. POVEDA. 1983. Checklist of trees. In: D. H. Janzen (ed.). Costa Rican natural history. University of Chicago Press, Chicago, pp. 118-157.
- HEMSLEY, W. B. 1885. Biologia Centrali-Americani, Botany III, 414.
- HOLDRIDGE, L. R., W. C. GRENKE, W. H. HATHEWAY, T. LIANG, AND J. A. TOSHI, JR. 1971. Forest environments in tropical life zones. Pergamon Press, New York.
- LOOMIS, H. F. 1939. A new palm from Costa Rica, *Astrocaryum alatum*. J. Wash. Acad. Sci. 29: 141-146.
- MÓORE, H. E. 1973. A synopsis of the palm flora at Finca La Selva, Costa Rica. Unpublished, but widely distributed in Cornell University Extramural course books and Organization for Tropical Studies course books.
- STANDLEY, P. 1928. Flora of the Panama Canal Zone. Contr. U.S. Natl. Herb. 27.
- . 1937. Flora of Costa Rica. Publ. Field Mus. Nat. Hist., Bot. Ser. 18: 108.

Note added in proof. Additional specimen examined: Panama. Comarca de San Blas: El Llano-Carti Rd. km 16.6, 9°19'N, 78°55'W, 350 m, 1 June 1985, *de Nevers & Herrera 5818* (MO, PMA). Inflorescence warm, flws. yellow, visited by *Trigona* bees and *Cyclocephala* beetles (87 beetles seen).

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LETTERS

March 4, 1988

Dear Natalie,

I hope you received the flowers and pinnae in FAA with no trouble. The herbarium sheets should be coming along in a few days. All in all the trip to Costa Rica and Panama was a fabulous success. We gathered much good material for the *Chamaedorea* book.

Unfortunately, my happiness with the success of the trip must be tempered due to a disturbing situation that we came across in Panama. I thought you would want to hear of it. When I was in Panama in April, we came upon a locale near El Valle that had abundant populations of several chamaedoreas, including two extremely ornamental species, *C. pumila* and *C. amabilis*. A rough survey indicated that there were 100-200 of the former and well over a 100 of the latter in this one small area. Upon my return in December, I was dismayed to find only about a half dozen plants of each, the understory in this area having been almost completely denuded of these species! My Panamanian guide told me that in November an American who has frequented Panama several times in

the last year or two to gather palms was in El Valle and hired this Panamanian to collect 1,500 of the *C. pumila* and an untold but probably lesser amount of *C. amabilis* at this locale. At one point in my searching in December I came upon a pile of cut leaves of *C. pumila* in the bottom of a ravine. The pile was large, over several yards across with well over a 1,000 leaves in it. The Panamanian guide told me that this was where the plants were cleaned and prepared for shipment for the American. The populations of these two species at El Valle are just about non-existent now. These two species are unofficially listed as endangered in Costa Rica and since they have never before been reported for Panama, their status there is unknown.

A similar situation occurred not far from El Valle at El Cope where, upon my initial and only visit in December, I could not find either of two highly ornamental chamaedoreas and only a few plants of a third previously reported to be at this location. Again, as in El Valle, the forest floor had been pretty well cleaned out of chamaedoreas. My Panamanian guide's description of the collection methods used by the American at El Cope matched that given me by my other guide at El Valle.

Cont. on p. 100.