

± globose, dark brown to black when mature; stigmatic residue apical; epicarp smooth, thin; mesocarp fleshy, with longitudinal anastomosing fibers adjacent to the crustaceous endocarp. Seed 1 per fruit, free from the endocarp except at the small basal hilum, obovate, raphe as long as the seed, rather broad and ± sculptured; endosperm homogeneous; embryo lateral, slightly below equator towards the base, opposite the raphe.

Key to the Species of *Colpothrinax*

1. Trunk abruptly swollen ± medially; leaf blades divided centrally 1/3–1/2 to base, laterally >90% to base; corolla lobes not connate basally, deciduous, with a clear line of abscission; stamen-cup greatly exceeding calyx-cup; fruits 1.1–1.6 cm diam.; originally in lowland dry pine forests (almost all now converted to savannas or pastures), 0–ca. 200 m; Cuba. 3. *C. wrightii*

1. Trunk columnar; leaf blades divided centrally 1/2–2/3 to base, laterally <90% to base; corolla lobes connate basally, persistent, without a line of abscission; stamen-cup less than or ± equal to calyx-cup; fruits 1.6–2.1 cm diam.; (lowland–) premontane(–lower montane) wet forests, 350–1,600 m; Central America.

2. Inflorescence branches pink; calyx reddish, 2.7–3.4 mm long, free distally from corolla for 0.9–1.7 mm (1/4–1/2 its length); corolla 2.9–4.2 mm long, the lobes connate basally 1/3–1/2 their length, mostly pinkish, never touching, attenuate with acute apices, membranous, adaxially plane with slight apical thickening; stamen-cup 2.4–3.0 mm diam., fleshy, with walls 0.3–0.6 mm thick; gynoeceum 1.6–2.1 mm diam., the carpels reddish; isthmus Central America (southern Nicaragua, Costa Rica, Panama), 350–1,000 (–1,400) m. 1. *C. aphanopetala*

2. Inflorescence branches yellow; calyx yellow, 3.5–5.4 mm long, free distally from corolla for 1.9–3.7 mm (1/2–2/3 its length); corolla 4.0–6.0 mm long, the lobes connate basally 1/5–1/3 their length, mostly yellow, valvate with parallel sides and mucronulate apices, fleshy, adaxially furrowed with involute and/or thickened margins, forming a hood apically; stamen-cup 1.5–2.2 mm diam., membranous to slightly fleshy, with walls to 0.3 mm thick; gynoeceum 1.1–1.6 mm diam., the carpels cream-colored; northern Central America (Guatemala, Belize, Honduras), 700–1,200 (–1,600) m 2. *C. cookii*

1. *Colpothrinax aphanopetala* R. J. Evans, **sp. nov.** a *C. wrightii* trunco columnari differt; a *C. cookii* calyce rubello, curto; corolla plerumque curta, marginibus loborum adjacentium nunquam contiguus, lobis membranaceis; tubo staminum lato; gynoeccio lato, carpellis rubellis differt.

Typus: PANAMA, Panamá, Alrededores de Cerro Jefe, ca. 900 m, 24 January 1996, *Galdames et al.* 2419 (holotypus: PMA!; isotypi: SCZ!, US)

Trunk (12–)15–ca. 20 m tall, erect [2.5–10(–15) m tall, sometimes decumbent basally, on Cerro Jefe, Panama], 15–25(–40?) cm dbh, columnar, usually naked, sometimes, particularly in closed forest, upper portion partially or completely enclosed in a mat of persistent leaf-sheath fibers; trunks of juveniles less than ca. 6–8 m tall usually completely enclosed in this mat; mat, when present, usually 20–30 cm thick. Leaves 12–ca. 30; petiole (0.5–)1–1.5(–2) m long, 2.1–3.9 cm wide at attachment to blade; sheath tomentose, the trichomes of two intermixed types: 1) soft, stellate trichomes, ca. 0.5 mm long, basally ferruginous, with free, white distal ends and 2) coarser, longer, wavy, twisted, compressed trichomes, these longer trichomes sparsest, shortest (ca. 1.5 mm long), and lightest in color (± tannish) on the basal portion of the sheath, becoming progressively denser, longer (to 9 mm long), and darker (rufous) distally; sheath disintegrating and fraying into fine, loosely woven, pendulous, filiform, typically ± terete fibers, 0.3–0.5 mm diam.; hastula appressed to or slightly elevated above the blade, 1.6–3.0 × 1.9–4.3 cm, 1.1–1.6 times as wide as long, very broadly to depressed-triangular, usually cuspidate apically; costa (12.0–)17.5–28.0 cm long; blade 95–152 cm long centrally, 36–74 cm long laterally, divided into single-fold segments, except for lateral-most 1(–5) segments of each blade half composed of 1–2(3) folds; central division extending to within 33–70 cm of (1/2–2/3 to) base, the lateral-most division extending to within 6.5–10.5(–23.5) cm of [ca. (2/3–)7/8 to] base; folds per blade half 26–35; widest single-fold segment 4.1–6.0 cm wide. Inflorescences with flowers or fruit to ca. 5, plus ca. 5 marcescent per individual; primary-axis 1.5–1.9 m long; inflorescence bracts lanate, with trichomes 2–8 mm long; peduncle 0.4–0.7 m long; prophyll 18.0–28.0 × 7.0–10.0 cm; peduncular bracts 4–6, 21.0–43.5 cm long; rachis 1.1–1.3 m long; rachis bracts 9.5–49.0 cm long; first-order branches (5–?)8–12; axes creamy pink, their primary-axes 11.5–77.0 cm long, with unbranched proximal portion 6.5–48.0 cm long, the branched distal portion 2.5–38.0 cm long; prophyll 9.5–46.0 cm long; rachillae typically 30–50 per basal first-order branch, <10 per apical first-order branch, 2.0–15.0 cm long, tomentose,



12. Unidentified species of syrrhid fly visiting flowers of *Colpothrinax aphanopetala*, Cerro Jefe, Panama. Flowers at staminate anthesis. (photo by B. E. Hammel)

the trichomes (tannish to) ferruginous, 0.2–0.3 mm long; flower-bearing spurs 0.2–0.4 mm long, the subtending bracteole 0.5–1.2(–1.6) mm long, 0.3–0.9 mm wide basally. Floral receptacle 0.9–1.7 mm long; calyx 2.7–3.4 mm long, free distally from corolla for 1/4–1/2 its length, reddish with some yellow distally, the lobes 0.3–0.9 mm long; corolla 2.9–4.2 mm long, connate basally for 1/3–1/2 its length, mostly pinkish, creamy yellow marginally below apex, adjacent lobes never touching, the lobes attenuate with acute apices, membranous, adaxially plane with slight apical thickening, persistent, filaments 2.0–3.8 mm long, connate basally for 0.6–2.0 mm (1/3–3/5 their length), cream-colored, stamen-cup shorter than or \pm same length as calyx-cup, 2.4–3.0 mm diam., anthers 2.7–4.4 \times 0.8–1.1 mm; pollen 25–30 \times 20–30 μ m, tectum on non-apertural face coarsely perforate to reticulate; gynoecium 2.5–3.5 \times 1.6–2.1 mm, carpels 1.1–1.8 \times 0.9–1.4 mm, reddish, styles 1.4–2.0 mm long, cream-colored. Fruit 1.6–2.1 cm diam. Seed 1.0–1.3 \times 1.2–1.5 cm. (Figs. 2, 3, 5c, 6b, 8c & d, 9, 10, 12).

DISTRIBUTION: Extreme SE Nicaragua and on both the Caribbean and Pacific slopes in Costa Rica and Panama, 350–1,000(–1,400) m, typically in premontane, sometimes lowland, wet forests (Fig. 11).

ADDITIONAL SPECIMENS EXAMINED: NICARAGUA. Río San Juan. Reserva Indio Maíz, Municipio de San Juan del Norte, Cerro El Gigante, 10°46'N, 83°53'W, *Rueda et al.* 4537 (MO), 9042 (MO). COSTA RICA. Alajuela. Cordillera de Tilarán, northern margins of Laguna Cote, 10°34'30"N, 84°54'30"W, *Evans et al.* 2751 (BH, MO); Guatuso Cantón, Cordillera de Tilarán, Laguna Cote, 5 km norte de Finca Cote Hotel Ecological, 10°35'20"N, 84°55'50"W, *Rivera & Petruzzi* 2897 (INB, MO, US). Limón. Parque Internacional La Amistad, Fila Tsiurábeta, entre Ríos Urén y Lari, 9°27'30"N, 83°00'00"W, *Chacón* 290 (CR, INB); Reserva Indígena Talamanca, 9°27'00"N, 82°59'30"W, *Hammel et al.* 17623 (CR). Puntarenas: Cantón de Parrita, Fila Chonta, camino de San Marcos de Tarrazú a Cerro Cura, La Virgen, y Fila Chonta,

9°35'N, 84°10'W, Hammel *et al.* 21192 (INB); Cantón de Parrita, Cuenca del Pirris-Damas, Fila Chonta, Sector SE, 9°35'05"N, 84°10'25"W, Morales & Abarca 6298 (INB, MO). PANAMA. Chiriquí. Fortuna Dam area, along Quebrada Los Chorros, to N of reservoir, 08°45'N, 82°14'W, Churchill & Churchill 6035 (MO, US). Coclé. continental divide N of Penonomé on road to Coclesito, small patch of forest at roadside, Hammel 4033 (MO). Panamá. On road near slopes of Cerro Jefe, Antonio *et al.* 3384 (MO); Cerro Jefe, Carrasquilla 2134 (PMA), Dressler 2898 (BH, US), 3607 (PMA, US), Henderson & Bernal 2054 (NY, PMA), Henderson & Ferreira 3046 (NY, PMA), Moore *et al.* 10519 (BH); Cerro Jefe, summit near radio towers, 09°14'N, 79°23'W, Churchill 3930; 2.4 mi beyond Cerro Jefe on road to Altos de Pacora, along flat area before reaching summit, Croat 22669 (K, MO, NY); Cerro Jefe, along road W of hilltop, Hammel 4401 (BH, MO); road to Cerro Jefe, at turnoff to Alto Pacora, Henderson & Herrera 702 (BH, K, NY); E slope of Cerro Jefe, 10.5 km by road NE of Cerro Azul, Nee 11451 (BH, MO); summit of Cerro Jefe, Read *et al.* 79200 (US). San Blas. El Llano-Cartí, 5 km beyond Nusagandi, Henderson 083 (PMA); Road El Llano-Cartí Road, 24.5–25 km from Interamerican Hwy., near continental divide, Mori & Kallunki 5560 (MO); El Llano-Cartí Road, 22–24.5 km from Interamerican Hwy., 9°19'N, 78°55'W, de Nevers & Herrera 4260 (MO); Cerro Brewster, 9°18'N, 79°16'W, de Nevers *et al.* 4023 (MO), 5567 (MO, PMA), 6305 (NY).

HABITAT: *Colpothrinax aphanopetala* is most frequently encountered on the upper slopes and crests of ridges of premontane wet forests above 700 m elevation (Fig. 10), in association with *Euterpe precatoria* Mart. However, *C. aphanopetala* has been found to as low as 350 m elevation and sometimes occurs in areas with little or no topographic relief. For example, at Laguna Cote in Costa Rica *C. aphanopetala* is restricted to the low-lying, partially inundated margins of the lake, where it grows in saturated soil and emerges above a low-forest dominated by *Astrocaryum alatum* H. F. Loomis and *Heliconia*. Another noteworthy population of *C. aphanopetala* is that on Cerro Jefe in Panama. Adult *C. aphanopetala* in the windswept low-forest on Cerro Jefe are approximately half the size of typical adults elsewhere. The same phenomenon also appears to have produced the smaller-than-average *C. aphanopetala* found on the low, but isolated, often storm-swept Cerro El Gigante, which is only about 30 km inland from the Caribbean coast in extreme southeast Nicaragua.

LOCAL NAMES: *udirbi* ("Kuna"), *guágara*. [These names are cited on a single collection of *C.*

aphanopetala from Panama (de Nevers and Herrera 4260). The name *guágara* was probably mistakenly attributed to *C. aphanopetala*, as it is commonly used in Panama and Costa Rica for the sympatric palmate-leaved palm *Cryosophila warscewiczii* (H. Wendl.) Bartlett.]

Colpothrinax aphanopetala is easily and unambiguously identifiable when in flower, even if only in bud, or in fruit. The red calyx, small, pink-tinted, membranous corolla lobes (unique among all palms in the subtribe Livistoninae), which are persistent in fruit, and three distinct, red carpels are diagnostic (Fig. 12). The pinkish higher-order inflorescence branches (Fig. 3, left) also distinguish *C. aphanopetala* from both *C. wrightii* and *C. cookii*.

The trunk of *C. aphanopetala* is not swollen as in *C. wrightii*. Based on the available data (i.e., the relatively few, mostly incomplete herbarium specimens), *C. aphanopetala*, however, cannot be distinguished reliably from *C. cookii* when sterile. Although *C. aphanopetala* appears to have smaller leaf blades that are more deeply divided, at least laterally, and shorter petioles with smaller hastulas, the overlap between the two taxa for these characters is too great for them to be of any practical utility for identification purposes. This does not necessarily indicate, however, that *C. aphanopetala* and *C. cookii* have not diverged vegetatively. Extensive fieldwork involving detailed observations and measurements of individuals from multiple populations throughout the ranges of both species would probably yield subtle morphological differences in vegetative (and other reproductive) characters that cannot be represented adequately on herbarium sheets. This has proven to be the case with other genera of coryphoid palms (e.g., *Cryosophila*, see Evans 1995; *Thrinax*, see Read 1975). Fortunately, the floral morphologies of *C. aphanopetala* and *C. cookii* are so strikingly different that as long as flowers or fruit (with their persistent calyx and corolla lobes) are present, herbarium specimens are sufficient for easy and unambiguous identification to species.

The reddish flowers of *C. aphanopetala* are visited by large numbers of a variety of bees [e.g., *Trigona* (Apidae: Meliponinae)] and flies (e.g., Syrphidae) during anthesis, suggesting one or both of these groups of insects as potential pollinators. One species of syrphid fly (Fig. 12) has been observed visiting flowers at various stages of floral maturation making them particularly likely pollinators since the stigmas do not appear to be receptive until after the anthers have fallen. Due to the small size of the corolla lobes in *C. aphanopetala*, the reproductive parts are never

enclosed within the corolla as is the case with the probably beetle-pollinated *C. cookii*.

The only reported use for *C. aphanopetala* has been the leaves for thatching (*de Nevers & Herrera 4260*).

The specific epithet refers to the small, membranous, and not readily apparent corolla lobes of this species.

2. *Colpothrinax cookii* Read, *Principes* 13: 13. 1969. Type: GUATEMALA, Alta Verapaz: Sepacuite coffee estate, north of Panzós, on the northern slope of the principal range of mountains crossed leaving the Polochic Valley, 1200 m, 22 March 1902, *Cook & Griggs 116* (holotype: US!; isotype: BH!).

Trunk (5–)10–20 m tall, erect, 15–25 cm dbh, columnar, usually naked, sometimes, particularly in closed forest, upper portion partially or completely enclosed in a mat of persistent leaf-sheath fibers; trunks of juveniles less than ca. 6–8 m tall usually completely enclosed in this mat; mat, when present, usually 20–30 cm thick. Leaves 15–ca. 30; petiole (1–)1.5–2.5(–3) m long, 2.3–3.4 cm wide at attachment to blade; sheath tomentose, the trichomes of two intermixed types: 1) soft, stellate trichomes, ca. 0.5 mm long, basally ferruginous, with free, white distal ends and 2) coarser, longer, wavy, twisted, compressed trichomes, these larger trichomes sparsest, shortest (ca. 1.5 mm long), and lightest in color (\pm tannish) on the basal portion of the sheath, becoming progressively denser, longer (to 9 mm long), and darker (rufous) distally; sheath disintegrating and fraying into fine, loosely woven, pendulous, filiform, typically \pm terete fibers, 0.3–0.5 mm diam.; hastula appressed to or slightly elevated above the blade, 2.3–3.4 \times 2.4–3.9 cm, 0.7–1.4 times as wide as long, broadly to very broadly triangular, usually cuspidate apically; costa 16.5–38.5 cm long; blade 131–170 cm long centrally, 62–136 cm long laterally, divided into single-fold segments, except for lateral-most segment of each blade half, composed of 2(–4) folds; central division extending to within 46–67 cm of (1/2–2/3 to) base, the lateral-most division extending to within 11.5–19.0 cm of (ca. 4/5 to) base; folds per blade half 25–35; widest single-fold segment 4.3–5.0 cm wide. Inflorescences with flowers or fruit to ca. 5(–8), plus ca. 5(–7) marcescent; primary-axis 1.2–2.1 m long; inflorescence bracts lanate, with trichomes 2–8 mm long; peduncle 0.2–0.8 m long; prophyll ca. 25 \times 8.0–10.0 cm; peduncular bracts 6–7, 27.0–45.0 cm long; rachis 0.9–1.4 m long; rachis bracts 14.0–47.0 cm long; first-order branches 9–12; axes creamy yellow, their primary-axes 12.0–58.5 cm

long, with unbranched proximal portion 2.5–37.0 cm long, the branched distal portion 6.0–32.0 cm long; prophyll 10.5–40.5 cm long; rachillae typically 40–50 per basal first-order branch, 10–20 per apical first-order branch, 3.0–15.5 cm long, tomentose, the trichomes (tannish to) ferruginous, 0.2–0.3 mm long; flower-bearing spurs 0.2–0.8(–1.2) mm long, the subtending bracteole 0.7–2.0 mm long, 0.4–1.0 mm wide basally. Floral receptacle 0.7–1.7 mm long; calyx 3.5–5.4 mm long, free distally from corolla for 1/2–2/3 its length, creamy yellow, the lobes 0.5–0.8 mm long; corolla 4.0–6.0 mm long, connate basally for 1/5–1/3 its length, mostly creamy yellow, the lobes valvate, with parallel sides and mucronulate apices, fleshy, adaxially furrowed with involute or thickened margins, forming a hood apically, persistent; filaments 2.1–4.0 mm long, connate basally for 1.1–2.0 mm (2/5–3/5 their length), cream-colored, stamen-cup shorter than or \pm same length as calyx-cup, 1.5–2.2 mm diam., anthers 2.3–3.5 \times 0.9–1.3 mm; pollen 25–30 \times 20–30 μ m, tectum on non-apertural face coarsely perforate to reticulate; gynoeceum 2.5–3.4 \times 1.1–1.6 mm, carpels 1.1–1.6 \times 0.7–1.3 mm, cream-colored, styles 1.5–2.2 mm long, cream-colored. Fruit 1.6–2.1 cm diam. Seed 1.0–1.2 \times 1.3–1.5 cm. (Figs. 4, 5b, 6a, 8a & b).

DISTRIBUTION: Belize, Guatemala, and Honduras, 700–1,200(–1,600) m; typically in premontane, sometimes lower montane, wet forests on the Caribbean slope (Fig. 11).

ADDITIONAL SPECIMENS EXAMINED: BELIZE. Cayo. Vicinity of Doyles Delight, southern Maya Mountains, 16°30'N, 89°03'W, *Allen 15220* (MO). Toledo. Vicinity of Doyles Delight, southern Maya Mountains, 16°29'N, 89°02'W, *Allen 15450* (MO, US); southern Maya Mountains, Bladen Nature Reserve, ridge just south of the main divide of the Maya Mountains, 16°29'40"N, 88°59'33"W, *Davidse & Holland 36808* (BH, F, MEXU, MO); southwestern Maya Mountains, Columbia River Forest Reserve, Little Quartz Ridge, 16°24'25"N, 89°06'07"W, *Holst 4333* (MO, US); Columbia Forest Reserve, Little Quartz Ridge, slopes on SW end, 16°23'56"N, 89°06'55"W, *Holst & Meadows 5747* (BH, K, MO, NY). GUATEMALA. Alta Verapaz. Sepacuite, *Cook & Doyle 156* (US), *163* (US), *166* (US), *174* (US); near the Finca Sepacuite, *Cook & Griggs 115* (US), *117* (US). HONDURAS. Atlántida. narrow crest of ridge leading up to Pico Bonito from the NE (from near the Río Bonito at its confluence with large quebrada), 15°38'N, 86°52'W, *Evans 2547* (MO); Cordillera Nombre de Dios, fila de la Lora, between Quebrada El Manchón and Quebrada San José, ca. 2 km N of El Manchón, 15°28'N, 87°07'30"W, *Evans et al.*