

A Revision of *Pseudophoenix*

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1. *Pseudophoenix lediniana* at Fairchild Tropical Garden displaying its characteristically ventricose trunk.

This new revision recognizes only four taxa, *Pseudophoenix ekmanii* Burret, *P. lediniana* R.W. Read (Fig. 1), *P. sargentii* H. Wendl. ex Sarg., and *P. vinifera* (Mart.) Becc., based on examination of extensive herbarium holdings and living plants, both in the field and in cultivation. Complete descriptions, a key to the species, ranges and a review of previous work in the genus are provided. A neotype for the name *Sargentia ariococca* is designated.

One might think that *Pseudophoenix*, which was revised by R.W. Read in 1968, is hardly worthy of another taxonomic revision. Nevertheless, a combination of circumstances makes such a revision not only possible but necessary. First, the accessibility of the islands of the Caribbean has never been easier, and areas not visited by Read have been better explored since 1968. Second, the collecting activities of several botanists such as A. Henderson, M. Mejía, H. Quero and T. Zanoni, have brought to light many new and important specimens. In 1968, Read had 57 specimens at his disposal; I was fortunate to have over 140 specimens available for this work. Third, *Pseudophoenix* species in cultivation at Fairchild Tropical Garden, many from seeds collected by Read, are now mature and easily studied. Last, *Pseudophoenix* is the focus of conservation interests in several areas of the Caribbean Basin. Regrettably, *Pseudophoenix* is more endangered now that it was in 1968, and a solid taxonomy must be the foundation of any conservation efforts.

This taxonomic revision examines *Pseudophoenix* from throughout its range, relying on data collected from both preserved and living specimens. Field work was carried out in Florida, Cuba, Bahamas, Mexico, and the Dominican Republic. Cultivated specimens were studied at Fairchild Tropical Garden, the Montgomery Botanical Center (Miami, FL) and private gardens in the Miami area. Specimens from the following herbaria were consulted: A, BH, CICY, FI, FTG, GH, HAJB, IJ, K, MO, NY, S and US (abbreviations follow Holmgren et al. 1990). Floral measurements were made from either pickled material or rehydrated material. Fruit and seed measurements were made from pickled or dried fruits.

Distribution

Pseudophoenix is quintessentially Caribbean (Fig. 2), occurring on the Florida Keys (Elliott Key at present, but also Sands and Long Keys in historical times), the Bahamas, Cuba, and Hispaniola (Haiti and the Dominican Republic), and Puerto Rico (present only on Mona Island). In Cuba, it has been collected from Camagüey Province in the central northern coast and in the extreme eastern tip of Guantánamo Province (Maisí). *Pseudophoenix* also occurs in the Yucatan Peninsula, in Mexico (the states of Yucatán and Quintana Roo) and Belize (on Ambergris Cay). In the Turks and Caicos Islands and in the Bahamas, the genus is widespread. It is absent from Cat and Crooked Islands and the northern islands of Abaco and Grand Bahama. It is also absent from Jamaica and the Cayman Islands.

Small island populations of *Pseudophoenix* often appear marginally distinct from mainland

populations, perhaps as the result of genetic isolation from the mainland and subsequent inbreeding and loss of dispersability. Island populations have been given formal taxonomic recognition. Saona (off the south-eastern coast of the Dominican Republic) is the type locality for a species once known as *P. saonae* Cook. This taxon occurs on several small islands around Hispaniola but is not found on the mainland. Populations of *Pseudophoenix* from Ile de La Gonâve (Haiti) were once distinguished as *P. gracilis* Ekman ex Burret. Navassa, a small island off the southwestern tip of Haiti (but administered by the U.S. Coast Guard) is home to *P. navassana* Ekman ex Burret. All of these species are included here within *P. sargentii*.

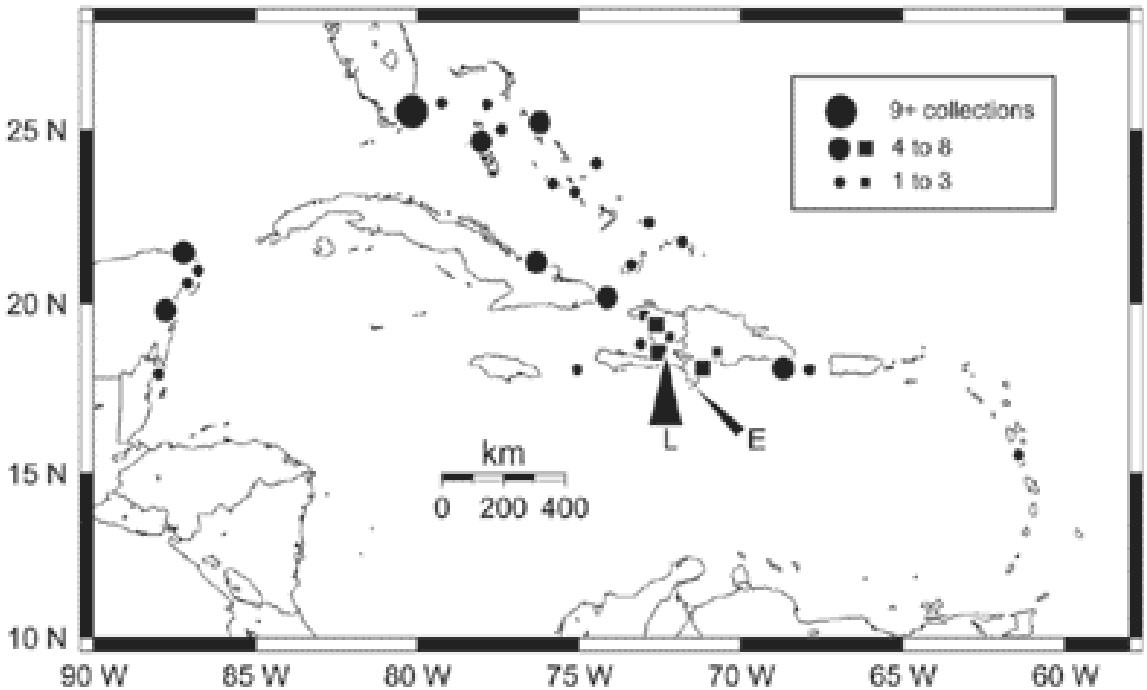
In an intriguing report, Read (1969) told of discovering a large population of *Pseudophoenix sargentii* on Dominica, although the genus is not mentioned in the flora of that island (Hodge 1954). Recently, Read's discovery has been confirmed by Bertrand Jean-Baptiste and Arlington James (pers. comm.) of the Dominica Forestry Department, who have found a substantial population of *Pseudophoenix* (>700 plants) in the vicinity of Mero. A single fertile specimen (*Garvue, Toussaint & Guye s.n.* at FTG), collected on 21 April 2001, confirms Read's thirty-two-year old supposition that this population is *P. sargentii*. The disjunction between the northern Greater Antilles and Dominica is remarkable.

Previous Work

The history of the discovery of *Pseudophoenix* has been recounted several times (Curtiss 1887, Sargent 1888 and 1896, Small 1920, Bailey 1939, Ledin et al. 1959a, Read 1968, Lippincott 1992), so another detailed retelling would be superfluous. Instead, a synopsis of the discovery is offered. On 16 or 19 April (accounts vary as to the exact date) 1886, C. S. Sargent, A. H. Curtiss, C. E. Faxon and crew members from the Navy Lighthouse Tender 'Laurel' landed on Elliott Key, at the pineapple plantation of Mr. Henry Filer. The botanists saw a small palm left standing in a clearing. They recognized immediately that it was new to the flora of North America. A specimen with unripe fruits was sent to Prof. H. Wendland, who concurred that it was new and bestowed the name *Pseudophoenix sargentii* on the palm.

Sargent's publication of *P. sargentii* H. Wendl. ex Sarg. in 1886 became the taxonomic foundation of the genus. Thereafter, several noteworthy botanists turned their attentions to *Pseudophoenix* with mixed success.

Odoardo Beccari was the first to conclude that the Hispaniolan palm illustrated by C. Plumier as



2. Distribution of *Pseudophoenix* in the Caribbean Basin. Circles = *Pseudophoenix sargentii*; squares = *Pseudophoenix vinifera*; narrow triangle = *Pseudophoenix ekmanii*; wide triangle = *Pseudophoenix lediniana*. Circle and square sizes indicate numbers of herbarium collections seen for this study: small = 1–3 collections, medium = 4–8 collections and large = 9 or more collections.

“*Palma dactylifera et vinifera*” and described by Martius in 1845 as *Euterpe* ? *vinifera* belonged to Wendland’s new genus *Pseudophoenix*. In his account of the palms of Cuba, Beccari (1912) transferred *E.* ? *vinifera* to *Pseudophoenix*. He was uncertain whether the *Pseudophoenix* of Cuba, which he knew from only sterile fragments, belonged to *P. sargentii*, *P. vinifera*, or even a third, undescribed species. Britton and Millspaugh (1920) believed that *P. vinifera* and *P. sargentii* were identical, a conclusion accepted by Sargent in the second edition of his “Manual of the Trees of North America” (1922). In both publications the name *P. vinifera* was used. John K. Small (1922) provided a lucid historical account of the two known species and chronicled their discovery in Florida, Hispaniola, Cuba, and the Bahamas.

Orator F. Cook published three new species from Cuba and Hispaniola, as well as a segregate genus, *Cyclospathe* to accommodate *Pseudophoenix* from the Bahamas (Cook 1902, 1923). Cook (1902) placed *Pseudophoenix* and *Cyclospathe* in the tribe Cyclospatheae, but in 1913, he elevated the tribe to the rank of family, the Pseudophoenicaceae. In his over-reliance on trunk and foliage characters, he confused *Pseudophoenix* with *Gaussia* (which he called *Aeria*) (Cook 1923). Flowers were unknown for each of the three species described

by Cook. Had he known flowers, it is unlikely he would have confused the two genera.

In 1929, Max Burret published several new species from material collected in Hispaniola by intrepid field collector Erik Ekman. Burret had the disadvantage of never seeing these palms in the living condition, either in the field or in cultivation, and hence relied entirely on Ekman’s judgement and notes. Liberty Hyde Bailey (1939) provided a useful account of the history of the species known up to that time, along with an English-language description of the species.

Robert W. Read, working at Cornell University under the direction of H. E. Moore Jr., took up the revision of the genus as his M.Sc. degree project. Read reduced Cook’s family Pseudophoenicaceae to subfamily Pseudophoenicoideae, and he recognized only four species: *P. sargentii*, *P. vinifera*, *P. ekmanii* and *P. lediniana*, which he described as new. He reduced several taxa to infraspecific status under the variable *P. sargentii*, giving us *P. sargentii* ssp. *saonae* var. *saonae* and *P. sargentii* ssp. *saonae* var. *navassana*. Although Read made field collections in Hispaniola and observed cultivated specimens at Fairchild Tropical Garden, he did not see living material of *P. ekmanii* or *P. sargentii* ssp. *saonae* var. *navassana*.



3 (left). The petioles, sheathing leaf bases and crownshaft of *Pseudophoenix sargentii*.

4 (facing page). The spectacular *Pseudophoenix ekmanii* in the juvenile condition with the waxy white internodes. These two palms were photographed in October, 1999, in their natural habitat in Barahona, Dominican Republic. (Photo: C. Morici)

Leaf and floral anatomy were addressed by Tomlinson (1961) and Read (1968). The species of *Pseudophoenix* are noteworthy for having a massively sclerotized, fibrous hypodermis on the adaxial surface of the leaf segments, along with a well-developed palisade layer. Pollen morphology was surveyed with both light and scanning electron microscopy by Ambwani and Kumar (1993). They found slight differences among their samples of *P. sargentii*, *P. vinifera*, and *P. ekmanii*; however, it is not known whether these minute differences in pollen wall sculpture and thickness would hold up with wider sampling.

Read (1966) reported on the chromosome number for *Pseudophoenix sargentii* and *P. vinifera*. He found both species have $n = 17$, a haploid number that is unique in the subfamily Ceroxyloideae and uncommon elsewhere in the family (Johnson 1985, Uhl & Dransfield 1987).

The phytochemistry of the genus is poorly known. Williams et al. (1973) examined *P. sargentii* and found none of the compounds that are common elsewhere in the family. They found no negatively

charged flavonoids, no flavone C-glycosides, no tricin, luteolin, apigenin, quercetin, kaempferol, nor leuco-anthocyanins. Cyanogenesis, which is rare in the palms, was not detected in *P. lediniana* by Lewis and Zona (2000). Coumarins, which occur sporadically throughout the family, are present in *Pseudophoenix ekmanii* (Zona & Downum, pers. obs.).

The genus presents several unique morphological features (Uhl & Dransfield 1987), making its systematic placement difficult. Uhl and Dransfield (1987) justified its placement in the Ceroxyloideae by its multiple peduncular bracts and single phloem strand in the central vascular bundles of the petiole. Recent molecular studies (Uhl et al. 1995, Baker et al. 1999, Asmussen et al. 2000) argue for a more isolated position in the family, without close relationships with the remaining Ceroxyloideae. *Pseudophoenix* is, by all accounts, an isolated member of the palm family.

Morphology

Pseudophoenix germinates in the remote-tubular mode and begins its life with a narrowly lanceolate



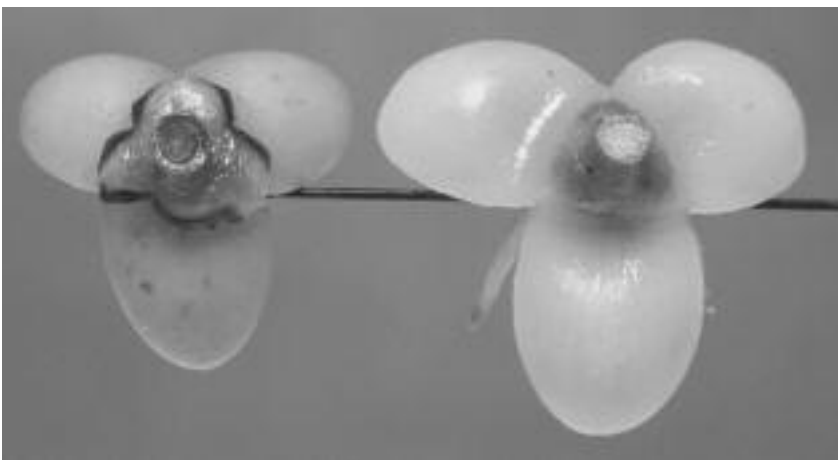


5 (left). Crown of *Pseudophoenix ekmanii*. Note the virtual absence of petiole. 6. (right) Ken Neugent, of Fairchild Tropical Garden, stands beside a decapitated juvenile of *Pseudophoenix ekmanii*. Although the population occurs in a national park, destructive poaching still threatens the species.

eophyll (Uhl & Dransfield 1987). It is always a single-stemmed palm, with the stem erect and cylindrical, weakly to grossly ventricose, or lageniform (bottle-shaped). In *P. vinifera* and *P. ekmanii*, reproduction does not commence until after their stems have produced their characteristic swellings. The stem may have conspicuous or inconspicuous leaf scars and internodes when young. The internodes in *Pseudophoenix ekmanii* have a white waxy bloom that contrasts markedly

with the brown leaf scars. At maturity, stems are gray or brownish gray. No part of the stem bears spines or prickles.

The leaves are alternate and spirally arranged, although in juveniles the leaf arrangement is distichous. Each leaf has a sheathing base that forms a weak crownshaft. The two opposing edges of the sheath meet on the side of the stem opposite the petiole and are fused for a portion of their length (Fig. 3). The apex of the sheath is often



7. Spirit-preserved flowers of *Pseudophoenix lediniana* (left) and *P. vinifera* (right) showing the lobed calyx of the former and the triangular calyx of the latter species.



8 (left). One of the few remaining adult *Pseudophoenix sargentii* on Elliott Key, Biscayne National Park, Florida, USA. 9 (right). *Pseudophoenix sargentii*, Yucatan, Mexico.

clothed in both silvery and black scales. The leaf sheath splits on the side opposite the petiole and cleanly falls away from the stem. A petiole may be present (elongate on juveniles) or more-or-less absent. The leaf rachis is rounded abaxially, channelled adaxially (when young) or channelled with a low ridge running the length of the rachis

(when mature). The segments of the leaf are arranged sub-regularly and displayed in more than one plane; each segment possesses a single midvein with 3–6 secondary veins on either side of the midvein, as well as numerous tertiary veins. Segments are lanceolate with acute apices. Segments near the base of the leaf are small and



10. The last remaining *Pseudophoenix sargentii* on Navassa Island. (Photo: M. Smith)



11. *Pseudophoenix sargentii* is stunted and dwarfed by the harsh growing conditions on Whale Cay, Bahamas.

slender but achieve full size a short distance above the base. They again diminish in size toward the apex. Plication is reduplicate. Leaf segments often bear ramenta along the midvein on the abaxial surface. The leaf is entirely unarmed, although juvenile leaf segments of *P. ekmanii* are stiff and their acute apices are almost spinescent. Leaves may be concolorous, slightly glaucous abaxially, or glaucous throughout. Variation in glaucousness is continuous and is given no taxonomic weight.

Flowering in *Pseudophoenix* occurs on infrafoliar or interfoliar, axillary inflorescences branched up to four orders. The posture of the inflorescence, given great taxonomic weight by Read (1968), varies continuously from erect to decumbent to pendulous. The stout peduncle is sheathed by a primary dagger-shaped bract (prophyll), bearing scurfy dark, caducous pubescence along the two keels but otherwise glaucous, opening apically. One or more additional bracts of similar

12. *Pseudophoenix sargentii* cultivated at Fairchild Tropical Garden from seeds collected on Elliott Key, Florida, in 1982. Note the erect leaves in these two plants (foreground and back right). The inflorescences are also erect, crowded among the leaves.



morphology are included within the primary bract. The proportion of the peduncle covered by the primary bract was used as a taxonomic character within *P. sargentii* (Read 1968), but this character now appears to be of no value.

Rachillae are divaricating in *Pseudophoenix ekmanii* and *P. sargentii* but are distally directed (lax rachillae pointing toward the apex of the more-or-less pendulous inflorescence) in *P. vinifera* and *P. lediniana*. The characteristic of the rachillae are therefore useful at making the "first cut" in keying out species. Flowers are borne singly along the

rachillae. They may be hermaphroditic or staminate, with the latter more common at the distal end of the rachillae. The sexual expression of the palm is andromonoecious.

Flowers are borne on a pseudopedicel, the anatomy of which suggests it is composed of the elongated receptacle and fused base of the calyx (Cook 1902, Read 1968). Although each flower is subtended by a bract, bracteoles are absent from the pseudopedicel or its base. The calyx is a shallow, three-sided or three-lobed cupule, which persists in fruit. Petals are three,

distinct, ovate, valvate, green, glaucous abaxially. The petals may have 6–24 major longitudinal veins. There is slight adnation between the petals and the stamens. The six stamens have slender filaments that are basally connate into a short tube. The apex of each filament is “inserted” into the connective of the anther; the anthers are dorsifixed but not versatile.

Anthers are large and conspicuous, yellow, and somewhat pointed at their apices. Dehiscence is latrorse-introrse. The gynoecium is superior, green, solitary, comprising three connate carpels, conical to ovoid with an acute apex. The stigma is inconspicuously trifid. The pistillode (in staminate flowers) is pyramidal or conical and inconspicuous. Flowers in *Pseudophoenix*, while not detectably fragrant, are colorful, secrete nectar and attract numerous hymenoptera. By all appearances, they are bee-pollinated.

Fruits are drupaceous and red when ripe. Each fruit has one, two or three separate endocarps, each endocarp bearing a single seed. The fruit is spheroidal if only one seed develops or deeply lobed if two or three seeds develop. The calyx, corolla, and filaments persist in fruits, providing useful characters by which to identify species. Whether the persisting petals are weakly to strongly reflexed or spreading has no taxonomic significance. The surface of the fruit is smooth and glaucous and may be shrivelled in dried fruits of *Pseudophoenix sargentii* and *P. ekmanii*. The mesocarp is fleshy; the endocarp is bony and brittle. The seed is spherical, brown with prominent raphe and fibers embedded in the testa. The endosperm is homogeneous.

Fruits are oily and colorful and, thus, likely to be animal-dispersed (Zona 1997). As fruits and seeds dry, they become buoyant – an air pocket develops as the seed shrinks from the endocarp – leading Read (1968) to suggest that they are adapted to water dispersal. Neither fruits, endocarps nor seeds are recorded among drift seeds (Guppy 1917, Gunn & Dennis 1976).

Taxonomy of *Pseudophoenix*

Pseudophoenix H. Wendl. ex Sargent, Bot. Gaz. 11: 314. 1886. Type: *Pseudophoenix sargentii* H. Wendl. ex Sarg.

Sargentia H. Wendl. & Drude ex Salomon, Die Palmen 160. 1887. Type: *Sargentia ariococca* H. Wendl. & Drude ex Salomon = *Pseudophoenix sargentii*.

Chamaephoenix (H. Wendl. ex Sarg.) A. H. Curtiss, Florida Farmer & Fruit Grower 1(8): 1. 1887. Type: *Chamaephoenix sargentii* H. Wendl. ex Curtiss = *Pseudophoenix sargentii*.

Cyclospathe Cook, Mem. Torrey Bot. Club 12: 25. 1902. Type: *Cyclospathe northropii* [as “*northropii*”] = *Pseudophoenix sargentii*.

Pleioanthic, andromonoecious palms. Stem solitary, erect, cylindrical, ventricose or lageniform, gray at maturity, smooth or prominently ringed with leaf scars, glabrous or waxy. Leaves alternate and spirally arranged (distichously arranged in juveniles), pinnately divided with leaf segments irregularly arranged along the rachis and displayed in multiple planes; sheath forming an incomplete crownshaft; petiole rounded abaxially, channelled adaxially (when young) or with a low ridge along the length of the adaxial channel (at maturity); segments greatly reduced at the base of the leaf, becoming largest at the middle of the leaf, and again reduced distally, lanceolate, lax or stiff; midvein prominent; secondary and tertiary veins numerous; transverse veins not evident; plication reduplicate. Inflorescence erect, ascending or arching, branched to 4 orders; peduncle dorsiventrally flattened, glabrous, bearing two bracts; prophyll oblanceolate, bearing scurfy dark scales along the two keels but otherwise glaucous, opening apically; inner bract bearing dark brown scales along both edges; inflorescence axis glabrous, with small bracteoles subtending each branch; rachillae divaricating or directed toward the apex of the inflorescence, glabrous. Flowers borne singly, subtended by a minute bract, borne on a pseudopedicel; calyx of 3 connate sepals, a shallow cupule with three spreading lobes or three-sided; petals 3, ovate, valvate, spreading in anthesis (spreading or reflexed in fruit); stamens 6 in two whorls, the outer whorl alternate with the petals, the inner whorl opposite the petals, basally adnate to the petals and sometimes briefly connate by their filament bases (forming a shallow staminal tube); filaments awl-shaped, with tips embedded in the connective; anthers elongate, somewhat gibbous, bilocular; dehiscence latrorse-introrse; pistillode (in staminate flowers) conical to pyramidal, green; gynoecium (in bisexual flowers) of 3 connate uniovulate carpels, trigonous-cylindrical to ovoid or conical, style absent, stigma apical, inconspicuously trifid. Fruit a drupe with 1–3 endocarps, globose with one endocarp, lobed with two or three endocarps, red, perianth and pseudopedicel persistent; mesocarp fleshy and juicy; endocarp globose or flattened globose, brown, smooth; stigmatic scar basal (in single-seeded fruits) or apical (in 2- or 3-seeded fruits). Seed globose or flattened globose, brown, with prominent impressed fibers radiating from the short, prominent raphe; endosperm homogeneous; embryo basal; germination remote-tubular, eophyll linear and undivided.

Key to the Species of *Pseudophoenix*

1. Rachillae lax, distally directed (i.e., the rachillae pointing toward the apex of the inflorescence, and the axes of the rachillae parallel to the main axis of the inflorescence; not divaricating); mesocarp firm in fresh fruits, drying smooth . . . 2

1. Rachillae divaricating; mesocarp watery in fresh fruits, drying wrinkled 3

2. Stem lageniform; calyx three-sided; petals 6.4–8.0 mm long; filaments 4.2–5.1 mm long, basally connate *P. vinifera*.

2. Stem weakly ventricose; calyx three-lobed; petals 5.5–6.0 mm long; filaments ca. 2.1 mm long, not connate *P. lediniana*.

3. Stem strongly ventricose; petioles absent; filaments 1.3–1.7 mm long *P. ekmanii*.

3. Stem cylindrical; petioles present; filaments 2.2–3.7 mm long *P. sargentii*.

1. *Pseudophoenix ekmanii* Burret, Sv. Vet. Akad. Handl. ser. 3: 19, t. 3A. 1929. Type: Dominican Republic: Barahona, *Ekman H-7055* (holotype: S!; isotypes: IJ!, K!, NY!, US!).

Stem 5–6 m tall, strongly ventricose, most slender above the swelling, ca. 60 cm dbh, with prominent brown leaf scars and waxy white internodes when young, gray when mature. Leaves ca. 12 in the crown, spreading (mature) or ascending (juvenile); leaf ca. 2–3 m long; sheath ca. 35 cm long, green with silvery gray scales near the apex; petiole absent; rachis ca. 161 cm long, often with brown scales along its margin; number of leaf segments per one side of the rachis not known; middle leaf segment 31.0–39.5 cm long, 1.7–2.3 cm wide, lanceolate with an acuminate tip, gray-green, densely glaucous on both sides, ramenta present on the abaxial surface of the midvein at the base of the leaf segment. Inflorescence erect, ascending or arching, branched to 3 orders, ca. 154 cm long; peduncle not extending far beyond the leaf sheaths, glabrous; prophyll not seen; inner bract not seen; rachillae 5.9–8.0 cm long and 0.8–0.9 mm diam., divaricating. Flower pseudopedicel 7.2–7.6 mm long, 0.4–0.5 mm diam., green to glaucous; calyx a shallow triangular cupule, 3.5–3.8 mm diam., green to glaucous, margins hyaline; petals ovate, ca. 7.0 mm long and 3.7 mm wide, green, glaucous abaxially, spreading, with ca. 13 major veins; filaments 1.3–1.7 mm long, briefly connate, anthers ovoid, ca. 2.8 mm long, ca. 1.5 mm wide, yellow; gynoeceum and pistillode not seen. Fruit 11.8–14.3 mm long, 11.7–13.2 mm diam. (in single-seeded fruits); endocarp 11.7–13.2 mm long, 11.1–12.6 mm

diam., ca. 0.2 mm thick. Seed 6.8–7.1 mm long, 8.5–9.4 mm diam. (Figs. 4–6, Front Cover)

DOMINICAN REPUBLIC. Pedernales: Barahona, *Ekman H-7055* (S, IJ, K, NY, US); 7 km S of Los Tres Charcos and ca. 7–8 additional km (by animal) toward Playa Blanca, *Zanoni, Mejía & Pimentel 36100* (NY); Isla Beata, *Loomis 94* (US). CULTIVATED. USA. Florida: Miami-Dade Co., Coral Gables, Fairchild Tropical Garden, 97-336, *Zona 785* (FTG).

This poorly known species is perhaps the most beautiful of all the *Pseudophoenix*. As juveniles, the trunks are waxy white with brown nodes and the leaves are gray and stiff (Fig. 4). At maturity, the stems become strongly ventricose to bottle-shaped (Front Cover). They are striking palms.

Pseudophoenix ekmanii resembles *P. vinifera*, in that they both have strongly ventricose trunks. Unlike that of *P. vinifera*, the trunk of *P. ekmanii* has waxy white internodes when young. *Pseudophoenix ekmanii* has a divaricating inflorescence and smaller fruits (<13.2 mm diam.), whereas the inflorescence of *P. vinifera* has distally directed branches and the fruits are larger (16.2–22.2 mm diam.). At any stage, *P. ekmanii* is easily distinguished from any other species by its absence of a petiole, that is to say, there is no obvious petiole between the sheathing leaf base and the leafy rachis (Fig. 5). Read (1968) reported that the stamen filaments are short (less than 1.5 mm long), but his observation was made from immature flower buds. The filament length reported here is based on the persistent filaments of the immature fruits of *Zanoni et al. 36100*.

Pseudophoenix ekmanii occurs at low elevations in the Parque Nacional Jaragua and Isla Beata. The vegetation in classified by Hager and Zanoni (1993) as Barahona Peninsula Dry Forest, and the substrate is limestone with little or no overlying soil. The region receives 630–800 mm of precipitation per year and has a distinct dry season from December to May (Hager & Zanoni 1993).

Although virtually the entire population of *Pseudophoenix ekmanii* occurs in a national park, the palm is still harvested for its sweet sap which is fermented into alcohol. Decapitated juveniles attest to the activities of sap poachers (Fig. 6). In addition, seed harvesting, if excessive, may threaten the reproductive health of the population.

2. *Pseudophoenix lediniana* Read, Gentes Herb. 10: 189, pl. 13C. 1968. Type: Haiti, Riv Levange, *Read & Pierre-Louis 1154* (holotype; BH!; isotype: FTG!).



13 (left). *Pseudophoenix vinifera* in Haiti. The palms are the only trees remaining on this deforested hillside. (Photo: C. Hubbuch)

14 (facing page). *Pseudophoenix vinifera*, Dominican Republic. Note abrupt tapering of the trunk that occurs after the individual has reached reproductive maturity.

Stem ca. 5 m tall, fusiform or ventricose, 25.1–32.5 cm dbh, gray, with prominent leaf scars when young. Leaves 15–17 in the crown, spreading; leaf ca. 270–310 cm long; sheath 36.0–58 cm long, green with silvery gray scales near the apex; petiole 25–60 cm long; rachis ca. 236 cm long, often with brown scales along its margin; leaf segments 140–160 per one side of the rachis; middle leaf

segment 49.0–66.5 cm long, 1.6–2.5 cm wide, lanceolate with an acuminate tip, gray-green, glaucous abaxially, glaucous to glossy adaxially, ramenta absent on the abaxial surface of the midvein at the base of the leaf segment. Inflorescence arching to pendulous, branched to 3 orders, ca. 1.7 m long; peduncle ca. 95 cm long and 4.0 cm diam., glabrous; prophyll ca. 104 cm



long, ca. 8.5 cm wide, bearing dark brown scales along both edges (keels); inner bract not seen; rachillae 13.0–14.7 cm long and 1.5–1.7 mm diam., directed toward the apex of the inflorescence. Flower pseudopedicel 0.7–2.0 mm long, 1.4–1.7 mm diam., green to glaucous; calyx a shallow three-lobed cupule, 4.0–5.2 mm diam., lobe apices rounded, green to glaucous, margins hyaline; petals ovate, 5.5–6.0 mm long, 4.7–4.9 mm wide, green, glaucous abaxially, spreading, with ca. 12 major veins; filaments ca. 2.1 mm long, not connate, anthers ovoid, ca. 4.3 mm long and 2.1 mm wide, yellow; gynoecium (in bisexual flowers) ca. 3.2 mm long and 2.0 mm diam. (pistillode in staminate flowers smaller), green. Fruit 17.2–25.1 mm long, 14.8–21.7 mm diam. (in single-seeded fruits); endocarp 15.2–17.6 mm long, 15.6–17.3 mm diam., ca. 0.5 mm thick. Seed 12.3–14.6 mm long, 10.9–14.2 mm diam. (Figs. 1, 7)

HAITI. Ouest: Trouin, *Cook s.n.* (US), *Cook s.n.* (BH); Riv Levange, *Read & Pierre-Louis 154* (BH, FTG); Grand Goave, limestone cliffs, *Read 237* (BH); between Grand Goave and Port-au-Prince, S of Fauché on old road to Jacmel, 18°24'N 72°44'W, *Henderson, Aubry, Balick & Vaval 1031* (NY); Grand Goave, steep limestone cliffs, *Ekman H5860* (IJ, K, FTG, NY, S, US). CULTIVATED. USA. Florida: Miami-Dade Co., Coral Gables, Fairchild Tropical Garden, 53-198A, *Zona 782* (FTG), 96-947, *Zona 777* (FTG).

Pseudophoenix lediniana is similar in many respects to *P. vinifera*, but the lobed calyx of *P. lediniana* is markedly distinct from the unlobed calyx of *P. vinifera* (Fig. 7). The stem of *P. lediniana* is not strongly bottle-shaped, as in *P. vinifera*, but rather slightly ventricose (Fig. 1).

Pseudophoenix lediniana is known only from wet forest along small canyons around Riv. Levange (Dep. de l'Ouest), which is the type locality. The palm is not valued for wine-making, and the area is under no severe threats by human activities. Nevertheless, the species is highly vulnerable and without protection.

In cultivation, *Pseudophoenix lediniana* is said to be the fastest-growing of all *Pseudophoenix*. It makes a lovely ornamental palm, but it is not yet common outside the collections of botanical gardens and enthusiasts (Fig. 1).

3. *Pseudophoenix sargentii* H. Wendl. ex Sarg., Bot. Gaz. 11: 314. 1886. *Chamaephoenix sargentii* H. Wendl. ex A. H. Curtiss, Florida Farmer & Fruit Grower 1(8): 1. 1887. Type: USA, Florida, Elliott Key, 16 Apr 1886, *Sargent s.n.* (holotype: A!; isotype: GH!; photo: BH!).

Sargentia ariococca H. Wendl. & Drude ex Salomon, Die Palmen 160. 1887. Type: not designated. Neotype (designated here): United States, Florida, Elliott Key, *J. K. Small, P. Matthaus & C. A. Mosier 9499* (neotype: NY!).

Cyclospathe northropii Cook [as "*northropi*"], Mem. Torrey Bot. Club 12: 25. 1902. Type: Bahamas, Andros Island, *J. I. & A. R. Northrop 508* (lectotype: NY!; isolectotype: US!).

Pseudophoenix saonae Cook, Jour. Washington Acad. Sci. 13: 406. 1923. *Pseudophoenix sargentii* ssp. *saonae* (Cook) Read var. *saonae*, Gentes Herb. 10: 210. 1968. Type: Dominican Republic, Saona Island, *Taylor 513* (holotype: US!; isotype: NY!; fragment: BH!).

Pseudophoenix linearis Cook, Jour. Washington Acad. Sci. 13: 407. 1923. Type: Cuba, Cayo Romano, *Shafer 2644* (holotype: US!; isotype: NY!; fragment: BH!; photo: FTG!).

Pseudophoenix gracilis Ekman ex Burret, Sv. Vet. Akad. Handl. ser. 3: 28. 1929. Type: Haiti, Ile de La Gonave, *Ekman H-9622* (holotype: S!; isotypes: A!, DA, K!, NY!, S!, US!).

Pseudophoenix navassana Ekman ex Burret, Sv. Vet. Akad. Handl. ser. 3: 27. 1929. *Pseudophoenix sargentii* ssp. *saonae* var. *navassana* (Ekman) Read, Gentes Herb. 10: 211. 1968. Type: Navassa Island, *Ekman H-10302* (holotype: S!; isotypes: K!, NY!, US!).

Stem 1–8 m tall, cylindrical, 9.5–25.0 cm dbh, gray, with prominent leaf scars when young. Leaves 7–16 in the crown, spreading or ascending; leaf 0.9–2.2 m long; sheath 18–41 cm long, green with silvery gray scales near the apex; petiole 24–119 cm long; rachis 64–165 cm long, often with brown scales along its margin; leaf segments 37–122 per one side of the rachis; middle leaf segment 29–64 cm long, 0.9–3.2 cm wide, lanceolate with an acuminate tip, gray-green, glaucous abaxially, glaucous to glossy adaxially, ramenta present on the abaxial surface of the midvein at the base of the leaf segment. Inflorescence erect, ascending or horizontal, branched to 3 or 4 orders, 100–150 cm long; peduncle often hidden by the leaf bases, 60–88 cm long, 1.7–1.8 cm diam., glabrous; prophyll 24–105 cm long, 2.6–6.0 cm wide, bearing dark brown scales along both edges (keels); inner bract 10–74 cm long, 1.6–5.0 cm wide, bearing dark brown scales along both edges; rachillae 1.3–5.5 (–9.0) cm long and 0.4–1.4 mm diam., strongly divaricating. Flower pseudopedicel 2.2–7.6 mm long, 0.4–1.0 (–1.7) mm diam., green to glaucous; calyx a shallow triangular cupule, 2.1–4.2 mm

diam., green to glaucous, margins hyaline; petals ovate, 4.8–6.6 mm long, 3.2–4.8 mm wide, green, glaucous abaxially, spreading, with ca. 7–13 major veins; filaments 2.2–3.7 mm long, basally connate forming a short staminal tube, anthers ovoid, 2.4–4.1 mm long, 0.8–2.5 mm wide, yellow; gynoecium (in bisexual flowers) 3.0–4.2 mm long, 1.0–2.3 mm diam. (pistillode in staminate flowers smaller), green. Fruit 10.6–17.1 mm long, 9.1–16.1 mm diam. (in single-seeded fruits); endocarp 7.9–13.5 mm long, 6.8–11.8 mm diam., 0.1–0.2 mm thick. Seed 6.4–10.5 mm long, 6.6–9.6 mm diam. (Figs. 3, 8–12)

BAHAMAS. Locality unknown, *Nickerson & Gross 3044* (A, FTG, MO); Andros, High Point Cay, *Brace 5301* (NY), Purser Point, Wide Opening, edge of marsh, *Brace 6771* (NY), Big Cabbage Creek, west side, *Northrop & Northrop 671* (NY), Loggerhead Creek, *Northrop & Northrop 508* (NY, US), small key near Mastic Key, *Bailey 1047* (BH); North Andros, ca. 8 mi. S of Fresh Creek, coppice, *Correll, Fehling & Stevenson 49397* (FTG, NY); Berry Islands, Whale Key, coppice, *Britton & Millspaugh 2197* (NY); S. Bimini, *Millspaugh 2398* (NY); Eleuthera, S of Glass Window, scrub, *Webster & Williams 10727* (FTG, S, US), Cape Eleuthera, coppice, *Correll & Hill 45332* (FTG, NY), 0.5 mi SE of Glass Window, *Proctor 30906* (IJ); Hummingbird Cay, *Kessler et al. 2754* (A, FTG); Great Exuma, between George Town airstrip and the coast, *Correll & Correll 47937* (FTG); Inagua, Miner's Tent to Balsom Hill, scrubland, *Nash & Taylor 1290* (FTG, NY); Little San Salvador, *Britton & Millspaugh 5671* (NY); Long Is., 2–6 mi S of Galloway's Landing, along Diamond Crystal Salt Company road, *Hill 2398* (FTG, NY); Mayaguana, SE point, *Wilson 7563* (GH, NY); New Providence, S of Fox Hills, coppice, *Britton & Brace 547* (K, NY), ca. 3 mi E of airport, *Corell 44313* (FTG). BELIZE. Ambergris Cay, off the north coast, *Turner 33* (BH). CUBA. Oriente [Camagüey or Guantánamo], north coast, *Natenson 25008* (HAJB); Camagüey: Cayo Guajaba, hills SE end, *Shafer 2815* (NY) and *Shafer 680* (A, GH, NY); Cayo Romano, Lomo de Loro, *Shafer 2644* (NY, US; fragment at BH, photo FTG), Alto del Aji, *Shafer 2790* (NY); Cayo Sabinal, *Ekman 18572* (S); Guantánamo: Maisí, *León 16291* (GH, HAJB, US); Maisí, Sabana, *León 16662* (GH, HAJB, US) and *León 16748* (HAJB, US), Cuesta del Chivo, *Legrá s.n.* (FTG); Las Tunas: Puerto Padre, El Copey, *Curbelo 16660* (HAJB); Santa Clara: Caibarién, Cayo Francés, *Ekman 18572* (S). DOMINICA. Near Mero, dry hill overlooking Castaways Hotel, *Read 2008* (US); Mero Estates, Mero, *Garvue et al. s.n.* (FTG). DOMINICAN REPUBLIC. La Altigracia: Isla Saona, SW shore of island, *Loomis 23* (US), in woods, *Liogier & Liogier 21878* (NY) and *Liogier & Liogier*

27279 (NY), interior, N of Playa El Canto de la Playa (on S side, E of Mano Jaun), 18°07'N 68°40'W, *Zanoni, Mejía & Ramírez 15154* (NY), Banks of salt lake, *Taylor 513* (NY, US; fragment and photo at BH); 2 km N of Guaraguao on road to Bayahibe, in wetland, *Zanoni & Mejía 16970* (NY); Puerto Plata: Sosua at Punta Goleta, coastal thickets, *Ekman H14526* (K, NY, S, US). HAITI. Ile de La Gonâve, hills above Pointe à Raquettes, *Ekman H-9622* (A, FTG, K, NY, S, US). MEXICO. Quintana Roo. Res. Sian Xa'an, 8 km NE of Vigia Chico, 19°48'N 87°31'W, *Sanders & Frame 1720* (NY, FTG); 2 km inland from Puerto Juarez on road to Valladolid, *Moore 8087* (BH); Isla Mujeres, 21°15'27"N 86°45'06"W, *Flores & Uacán 8815* (CICY); 0.5 km N of Xel-Ha, *Quero 2373* (MO); Yucatán: W of El Cuyo, among dunes, *Read et al. 79-012* (US); Mpio. Río Lagartos, cruce de playa Las Coloradas hacia Río Lagartos, *Orellana et al. 396* (CICY); Parque Natural Ría Lagartos, near Las Coloradas, *Leal & Espejel 205* (CICY); Mpio. Tizimin, road to El Cuyo, *Espejel & Uacán 200* (CICY); 6 km W of El Cuyo, *Uacán & Espejel 779a* (CICY); entrance to town of El Cuyo, 21°30'45"N 87°40'46"W, *Chan 5179* (CICY), 3 km E of El Cuyo, *Quero 2382* (MO); 8–10 km W of El Cuyo, 21°32'00"N 87°45'50"W, *Escalante 733* (CICY). NAVASSA ISLAND (USA). *Kiem & Pitt s.n.* (BH), E of the lighthouse, *Ekman H10802* (FTG, K, NY, S, US) PUERTO RICO. Mona Island: 0.8 km WNW of Uvero, *Proctor et al. 45905* (FTG). TURKS & CAICOS ISLANDS. East Caicos. Jacksonville, *Buden s.n.* (A); Middle Caicos, *Proctor 34073* (IJ). USA. Florida: locality unknown (probably Elliott or Long Key), *Curtiss s.n.* (A), locality unknown (sent to Beccari by Sargent), *Anonymous s.n.* (FI); Miami-Dade Co., Elliott Key, *Simpson 541* (GH), *Small & Nash s.n.* (NY), Mr. Filer's place, 19 Apr 1886, *Sargent s.n.* (A; photo BH), ca. 2 mi south of northern end, in dense thicket, *Ward & Ward 1579* (BH), *Small, Matthaus & Mosier 9499* (NY, US); Long Key, *Curtiss (?) s.n.* (A), near E end, high sandy hammock, *Small, Bailey, Matthaus 11592* (MO, NY), *Bailey & Bailey 6128* (BH, FTG), *Curtiss 5637* (BH, GH, K, MO, NY, US), Sands Key, hammock, *Small & DeWin Keller 10770* (GH, NY). CULTIVATED. BAHAMAS. New Providence, Nassau, garden, *Brace 381* (K, NY). CUBA. La Habana: Santiago de las Vegas (cultivated?), *Anonymous 343* (US); La Habana: Menocal estate, near Havana, *Bailey & Bailey 12532* (BH). DOMINICAN REPUBLIC. Prov. unknown: Arenoso near Santiago, *Bailey 311* (BH); Puerto Plata: Puerto Plata, (cultivated?), *Read s.n.* (FTG). MEXICO. Yucatán: Mpio. Río Lagartos, Río Lagartos, *Espejo et al. 4614* (CICY); Mérida, *Espinosa 2* (CICY), *Espinosa 18* (CICY), *Narváez 1171* (CICY), *Narváez 1322* (CICY), 21°01'30"N 89°38'30"W, *Simá 1710* (CICY). USA. Florida: locality unknown,



15. An enormous cultivated specimen of *Pseudophoenix vinifera*, Coral Gables, Florida, USA.

imported as adult trees from the Bahamas, *Hudson s.n.* (FI); Miami-Dade Co., Miami, *Franceschi s.n.* (FI), *Anonymous s.n.* (US), *Bessey s.n.* (FI), *Read s.n.* (BH), Hotel Royal Palm, *Andrews s.n.* (A), old Miami cemetery, *Dahlbert s.n.* (BH), Key Largo, *Read s.n.* (BH); Fairchild Tropical Garden, *Moore 5838* (BH), *Moore 5839* (BH), *Moore 5840* (BH), plot 113, CA-1104B, *Hull H-15* (BH, FTG), 58-872 (transplanted from wild population on Elliott Key), *Sanders 1667* (BH), plot 88, P4059D, *Hull H-31* (BH, FTG), 58-872, *Read 759* (BH, FTG), RM1522B (source: Cuba), *Zona s.n.* (FTG), 53-198A, *Zona 828* (FTG), 60-171C, *Balick et al. 3382* (NY), 58-80D,

plot 166, *Houghton 1376* (FTG), 60-171N, plot 189B, *Zona & Kernan 798* (FTG), RM1522C, plot 68, *Hull H-82* (FTG), 59-504, *Balick 3383* (NY), 60-171J, *Beck & Beck 1106* (FTG, NY); Monroe Co., Upper Matecumbe Key, *Small & Britton 9326* (BH), transplanted from Long Key, *Miller 1703* (US).

Read (1968, 1969) recognized several infraspecific taxa whereas a recent field guide (Henderson et al. 1995) recognize only one. Read himself (as quoted in Lippencott 1992) suggested that the infraspecific taxa do not deserve formal taxonomic rank, a suggestion endorsed here.

The taxonomic disposition of this, the most widespread taxon, is not uncontroversial. Some populations from small islands (Navassa, Gonâve, Saona) were previously recognized at some taxonomic rank, e.g., *Pseudophoenix navassana*, *Pseudophoenix gracilis*, *Pseudophoenix saonae*. Indeed these populations share a morphological trait – slightly larger fruits and seeds – that allow them to be distinguished from other populations of *P. sargentii*. Recognizing each island population as a distinct taxon seems misleading, as specimens cannot be readily distinguished from one another without knowledge of their geographic origin. Placing all of the populations in a single taxon is equally unsatisfactory, as such an action would imply that these island populations share a single common ancestor. In fact, these island populations are likely to have polytypic origins.

The characters of the inflorescence posture and length, along with primary bract length relative to the peduncle length, were employed by Read (1968, 1969). While there is certainly variation in these characters, the variation appears to have no geographic or population base. One population that I examined on Whale Key, Bahamas, had palms in which the inflorescence was either erect, horizontal or pendulous, and one-third to one-half as long as the leaves and in which the primary bract was one-half the length of the peduncle. Although this population corresponds to Read's *Pseudophoenix sargentii* ssp. *saonae* var. *saonae*, the bract length character alone corresponds to Read's *P. sargentii* ssp. *sargentii*. Quero (1981) noted similar difficulties in applying Read's taxonomic criteria to populations in the Yucatan Peninsula, Mexico.

On the northern coast of the Dominican Republic, near Sosua, *P. sargentii* has been extirpated by coastal development. (Zanoni 1986). Several populations of this species are endangered, one critically so. In Florida, small populations (Fig. 8) remain on Elliott Key (Lippencott 1992), where they are protected, but have been extirpated from Long and Sands Keys, where they once grew. In Mexico (Fig. 9), populations are threatened by coastal development and agriculture (Quero 1981, Durán 1995). The most seriously threatened population is that from the island of Navassa. Zanoni and Buck (1999) reported that *Pseudophoenix* on Navassa is now reduced to a single adult palm (Fig. 10). Introduced goats prevent reproduction by eating seeds and seedlings. Unless immediate action is taken, this unique population will be lost in the wild (offspring from Navassa palms survive in cultivation).

Pseudophoenix sargentii is found in coastal habitats,

although one site in southern Quintana Roo, Mexico, is more than 30 km inland (where the palm population is thought to represent relic populations along an ancient coastline) (Quero 1981). It occurs on limestone or dune sand over limestone in seasonally dry forest, tropical hammock, coastal scrub, etc. (Seifríz 1943, Ledin et al. 1959, Read 1968, Quero 1981). Under harsh conditions, it grows very slowly such that mature individuals have trunks less than 50 cm tall (Fig. 11). It grows easily but slowly in cultivation (Fig. 12), a situation which has contributed to the destructive practice transplanting wild specimens to gardens and landscapes.

4. *Pseudophoenix vinifera* (Mart.) Becc., Pomona Coll. Jour. Econ. Bot. 2: 268. 1912. *Euterpe vinifera* Martius, Hist. Nat. Palm. 1: t. ZII, F. 18, 19. 1845. *Cocos vinifera* Mart., Hist. Nat. Palm. 3: 324. 1853. *Gaussia vinifera* (Mart.) H. Wendl. in Kerchove, Palm. 245. 1878. *Aeria vinifera* (Mart.) Cook, Jour. Washington Acad. Sci. 13: 399. 1923. Type: Plumier t. 20, 21, ined.

Pseudophoenix insignis Cook, Jour. Washington Acad. Sci. 13: 400. 1923. Type: Haiti, Dept. de L'Artibonite, Passe Reine, Cook 28 (holotype: US!; fragment, BH!).

Stem 5–15 m tall, strongly ventricose, most slender above the swelling, gray, with prominent leaf scars when young. Leaves ca. 24 in the crown, spreading; leaf 2–3 m long; sheath 34–49 cm long, green with silvery gray scales near the apex; petiole 11–30 cm long; rachis 270 cm long, often with brown scales along its margin; leaf segments 115–131 per one side of the rachis; middle leaf segment 53–83 cm long, 1.7–3.1 cm wide, lanceolate with an acuminate tip, gray-green, glaucous abaxially, glaucous to glossy adaxially, ramenta present on the abaxial surface of the midvein at the base of the leaf segment. Inflorescence erect, ascending or arching, branched to 2 or 3 orders, ca. 125 cm long; peduncle down-curved, extending well beyond the leaf bases, glabrous; prophyll 102–156 cm long, ca. 8 cm wide, bearing dark brown scales along both edges (keels); inner bract ca. 50 cm long, bearing dark brown scales along both edges; rachillae 12.0–19.5 cm long and 1.5–2.6 mm diam., directed toward the apex of the inflorescence. Flower pseudopedicel (0.8–)2.5–4.4 mm long, 0.8–1.5 mm diam., green to glaucous; calyx a shallow triangular cupule, 3.1–5.9 mm diam., green to glaucous, margins hyaline; petals ovate, 6.4–8.9 mm long, 4.6–5.8 mm wide, green, glaucous abaxially, spreading, with ca. 24 major veins; filaments 4.2–5.1 mm long, basally connate forming a short staminal tube, anthers ovoid,

5.1–6.1 mm long, 2.4–2.9 mm wide, yellow; gynoecium (in bisexual flowers) 4.4–6.1 mm long, 2.5–3.7 mm diam. (pistillode in staminate flowers smaller), green. Fruit 17.6–23.7 mm long, 16.2–20.2 mm diam. (in single-seeded fruits); endocarp 15.2–16.9 mm long, 13.9–16.0 mm diam., 0.2–0.4 mm thick. Seed 11.1–14.7 mm long, 10.6–14.5 mm diam. (Figs. 7, 13–15)

DOMINICAN REPUBLIC. Azua: NE of Azua, between Azua and Estebania, 18°28'N 70°40'W, alt. 300 m, *Zanoni, Ramírez, & Peláez 15371* (NY); Barahona: El Jimi de Maygi, near Naranja, 7 km from Cabral on road to Polo, 18°11.535'N 71°14.631'W, *Zona et al. 739* (FTG); near Barahona, *Bailey 276* (BH); 1 mi W of Barahona, dry thickets, *Liogier 13607* (GH, IJ, NY); Independencia: hillside of Loma Grande, in Arroyo de Río Las Damas, 5.7 km from Puerto Escondido on road to Duverge, 18°20.5'N 71°32'W, alt. 350 m, *Zanoni & Pimentel 26455* (NY); 2 km N from Puerto Escondido, on road to Duverge, 18°22'N 71°32'W, alt. 425 m, *Gentry & Mejía 50807* (FTG, NY). HAITI. Locality unknown, *van Sterson s.n.* (K); *Anonymous s.n.* (FI); Artibonite: mountains 2–4 miles NE of Poteaux, 500 m elev., *Read 277* (BH); Passe Reine, *Cook s.n.* (US); Between Gonaïves and Ennery, *Cook 28* (US; frag & photo: BH); Poteaux, *Bailey 146* (BH); Centre: Morne Cabrit, elev. 2000 ft., *Cook s.n.* (US); Nord-Ouest: Vallée des Frois-Rivières, Port-de-Paix, Bassin Bleu, *Ekman H3977* (S); Ouest: ca. 2 mi S of Cabaret, *Read 276* (BH); Fond Chaleur, near Etang Saumatre, *Henderson & Aubry 1184* (NY); 3 km N of Source Matelas, *Zanoni, Mejía & Pimentel 33602* (NY); Ciment d'Haiti, along coastal road from Port-au-Prince to St. Marc, *Henderson, Aubry & Vaval 1039* (NY); Croix-des-Bronquets, Morne-à-Cabrits, elev. ca. 400 m, *Ekman H5496* (A, K, NY, S), *Ekman & Barker 5496* (EHH, photo BH); 15 mi N of Port-au-Prince, *Read 211* (BH). CULTIVATED. DOMINICAN REPUBLIC. Province unknown: Arenoso near Santiago, *Bailey 311* (BH); Distrito Nacional: Santo Domingo, Parque Eriquillo, *Zanoni et al. 11409* (NY); USA. Florida: Miami-Dade Co., Coral Gables, Fairchild Tropical Garden, 96-1416, *Zona 776* (FTG); Miami, Montgomery Botanical Center, 91-444A, *Zona s.n.* (FTG), Baker 1002 (FTG); Miami, USDA Plant Introduction Station, *Read 1397* (BH, FTG).

Pseudophoenix vinifera is distinguished from its congeners by its strongly bottle-shaped stem at maturity (Fig. 13), its distally directed rachillae and its triangular calyx (Fig. 7). In gross appearance, it most closely resembles *P. ekmanii*, but in aspects of the inflorescence, flower and fruit, it resembles *P. lediniana*.

Pseudophoenix vinifera occurs in dry forest, at

300–400 m elevation, in Haiti and the south-western Dominican Republic. In the past, this species was much exploited for the sweet sap that was fermented into “wine” (hence the epithet “*vinifera*”). The palm is still occasionally used for this purpose, but past exploitation has so diminished populations that the practice seems to have diminished as well. In Haiti (Fig. 13), *P. vinifera* survives in only two populations: between Poteau and Passe Reine (Dep. de l'Artibonite) and near Source Matelas (Dep. de l'Ouest) (Henderson et al. 1990). In the Dominican Republic, scattered palms are seen in the southern part (Provs. Azua and Barahona), but nowhere are populations large (Fig. 14).

Pseudophoenix vinifera makes a striking ornamental palm and is occasionally cultivated by collectors and botanic gardens (Fig 15).

Unplaced Specimen

Dominican Republic. Santiago Rodríguez: Los Quemados, west of Santiago de los Caballeros, *Read & Jiminez 199* (BH).

This specimen is identified as *Pseudophoenix vinifera*, but as such, it is anomalous for at least two reasons. While the fruit (immature) shape and aspects of the calyx suggest *P. vinifera*, the rachillae are divaricating, as in *P. sargentii*. Moreover, the collection site, in the province of Santiago Rodríguez, is far north of the known range of *P. vinifera* and too far inland for *P. sargentii*. The identity of this specimen must await the collection of additional materials from the same locality or vicinity.

Excluded Names

Palma americana Miller, Gard. Dict. Abr. ed. 4. 1754. Miller's description of this species suggests *Pseudophoenix vinifera*, but the identification cannot be made with certainty. See Moore (1963).

Pseudophoenix elata Cook ex Burret, Sv. Vet. Akad. Handl. ser. 3: 21. 1929, *in syn.* Nomen nudum.

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Horticulture Column

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Q. I need advice as to when and how I should transplant two *Copernicia baileyana* that need to be moved on my property. These plants were obtained seven years ago as 2-gallon container plants, they were planted in the ground four years ago, and the crowns now stand 1.5 m (5 ft) and 2.4 m (8 ft) tall. They are healthy plants growing in full sun. Judith Evans Parker, Miami, Florida.

A. Due to their slow growth rate and few roots, *Copernicia* species are not among the more tolerant of palms when it comes to transplanting. The ideal situation would be to wait and move these palms once visible trunk development begins. At this stage of growth, the root initiation zone has completed development and can produce new adventitious roots, which contributes to root system regeneration and speeds reestablishment following the move. Of course, trunk elongation in *Copernicia baileyana* generally occurs around 15–20 years of age. Your plants have a few years before developing the maximum diameter that precedes trunk elongation, and you have told me they need to be moved in the coming year.

How safe is it to transplant then? I asked Keith Lane for some help in answering this question.

Keith has broad experience transplanting palms for his business and has moved a number of smaller *Copernicia baileyana*. Depending on their health and site, he says young specimens like yours can be successfully transplanted with good care. Your robust plants in full sun should be in good condition for moving. You should begin the process in the Spring, once it is warm and the rainy season has commenced (April–May in South Florida). Transplanting at this time makes the best use of the growing season for recovery. For best results, the palms will need careful root-pruning and digging, and you should get experienced help for the transplanting. To minimize root system disturbance, Keith root-prunes in one-quarter increments, generally spaced across two months at this time of year. Watering is necessary throughout this time, in addition to any normal rainfall. Other practices to emphasize in this situation: when digging for the move, depending on the soil, wet it thoroughly first to keep the root ball together, or wrap the root ball with wire. Remove one-third of the older leaves to minimize water loss. During the first six months, water the palm in its new site to keep the root-ball evenly moist but not saturated.