Charles Wright and Cuban Palms. 1. Resurrection of *Coccothrinax acuminata*

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A new taxonomic treatment to demonstrate the legitimacy of the name *Coccothrinax acuminata* Becc. (Arecaceae) is presented. Two taxa, *Coccothrinax miraguama* var. *novo-geronensis* and *C. miraguama* subsp. *arenicola*, are treated as new synonyms. Three lectotypes are designated, and 38 isolectotypes not mentioned in previous publications are indicated.

The palm family has undergone an important process of diversification in Cuba, resulting in 15 genera with 79 species, 8 hybrids and 11 infraspecific taxa (Moya & Leyva 2000, updated by the first author). However, recent publications (Suárez 2015, Verdecia 2016, Moya et al. 2017), suggest that the taxonomic richness of the group in Cuba is not yet fully known.

This abundance of palms in Cuba has attracted a great deal of attention. Numerous researchers from various countries have made contributions, but they have not always taken into account the historical record. Therefore, for the development of a robust taxonomy of Cuban palms today, the task of reanalyzing historical information becomes a priority, in order to correct errors and eliminate possible causes of ambiguity and confusion.

In the genus *Coccothrinax*, restricted within the Caribbean Basin, 55 species have been described, seven infraspecific taxa and one hybrid. Cuba is its center of diversity where 39 species are found (38 of them endemic), seven

1. Stem with leaf sheaths and older infrutescence of *Coccothrinax acuminata* in Cortés, Pinar del Río. Photo by C.E. Moya.

2. *Coccothrinax acuminata* growing together with *Acoelorrhaphe wrightii* (left and background) in Cortés. Photo by C.E. Moya.

subspecies and one hybrid. Nine species have been reported in Hispaniola (seven of them endemic). Of the remaining, four are limited to the islands, two share their distribution between the islands and continental territory and only one is confined to the mainland (Jestrow et al. 2017).

The taxonomic treatment of this genus cannot be considered complete. On the one hand, new descriptions continue to be published; three occurred in the last four years (Mejía & García 2013, Suárez 2015 and Moya et al 2017). On the other hand, it is still necessary to refine part of the nomenclature used in previous accounts of currently recognized taxa.

A particularly complex taxonomic and nomenclatural situation occurs in western Cuba, around what could preliminarily be called the "*Coccothrinax acuminata* complex," a name used by different authors, although not always legitimately. It is a group that grows in the southern parts of the provinces of Pinar del Río and Artemisa, as well as in central and northern Isla de la Juventud. Taxa in this complex are characterized by the presence of short, pendulous mature infructescences, with a rachis partially down-curved, leaves that are 5/4 orbicular, with segments 12–15 cm long measured from the "shoulder" to the apex, thin leaf sheath strands 0.5–1 mm wide and densely woven in three layers (Fig. 1). In addition to the main species, two other infraspecific taxa, *Coccothrinax miraguama* (*novo-geronensis*) Becc. and *C. miraguama* subsp. *arenicola* (León) Borhidi & O.Muñiz, are involved.

The objectives of this paper are to offer a new taxonomic system that better reflects the natural variability in this complex, to evaluate the nomenclature used historically for it, to determine the accepted name, to reveal the location of the type material in different herbaria and to order the synonymy.

Materials and Methods

The nomenclature and taxonomy of what we refer to in this paper as "*Coccothrinax acuminata* complex" was investigated. A review was done of the protologues of the names used by different authors and of the different descriptions available in the main treatments. Expedition notes and species catalogs were also studied. A taxonomic study was made from a review of herbarium specimens and field studies conducted by the first author for over 30 years.

The following works were consulted: Sauvalle (1871, 1873), Gómez de la Maza (1893), Sargent (1899), Schumann (1901), Beccari (1907, 1913), Britton (1910, 1916), Shafer (1913), Jennings (1917), León (1918), Dahlgren (1936), León (1939, 1946), Borhidi and Muñiz

(1971), Glassman (1972), Muñiz and Borhidi (1982), Chiappy et al. (1986), Cejas and Herrera (1995), Hernández et al. (1995), Moya and Leiva (2000), Govaerts and Dransfield (2005), Govaerts et al. (2011), Acevedo Rodríguez and Strong (2012), Novo et al. (2015) and Greuter and Rankin (2016). The materials used by Beccari were reviewed in Cuccuini and Nepi (2006). The effectiveness, validity and legitimacy of each name used was checked using the International Code of Nomenclature for algae, fungi, and plants (ICN) (McNeill et al. 2012).

128 specimens of 38 collections (including 45 types) were reviewed from the following herbaria: BRU, CM, F, FI, GH, HAC, HCM, K, LE, M, MO, NY, P, US (acronyms *sensu* Thiers, 2016). Special attention was paid to the study of specimen duplicates (*Wright 3966*) in seven of these herbaria, as well as clarification of the location of the lectotypes and isolectotypes. A study was made of the exact locations of the collections made by Charles Wright that are basic to an understanding of the taxonomy and nomenclature of the taxon, as was a study done of the contrasting data annotated by him on herbarium labels. We also reviewed information available in the literature (Underwood 1905, Howard 1988) and the current cartography and phytogeography of the region (Borhidi 1996).

Field expeditions were carried out in localities where the presence of the taxon was known in the province of Pinar del Río: north of Cortés (Fig. 2), municipality Sandino; near Herradura, municipality Consolación del Sur; savannahs of El Sábalo, municipality Guanes, as well as the area surrounding La Cañada, La Fe, Siguanea, Las Nuevas, Hotel Colony and Nueva Gerona of Isla de la Juventud. Also visited were the localities of Las Pozas, Cajalbana and Viñales in western Cuba, where other species of the genus are reported. Diagnostic characters were studied *in situ*, and a preliminary key was developed to differentiate it from the other *Coccothrinax* species in that part of the country.

Results and Discussion

The evaluation and comparison of morphological, phenological and phytogeographic evidence, from plants *in situ* (during field trips) and from 126 herbarium specimens of *Coccothrinax* collected in western Cuba led the main author to the preliminary conclusion that all specimens previously designated as *C. acuminata*, *C. miraguama* (*novo-geronensis*) and C. *miraguama* subsp. *arenicola* constitute a single taxon.

Taxonomic and nomenclatural history

The first event relevant to the group under study was the collection of *Coccothrinax acuminata* made by Charles Wright and given the number *3966*, from which was established the first of the names involved. The labels of Wright's herbarium refer only to the country but do not specify the exact location in which they were collected (Howard 1988). However, a specimen in the Gray Herbarium, GH28253, has a note written by Wright, which says: "*Balestena Feby 23*." According to Gray (cited by Underwood 1905 and Howard 1988), Balestena was a cattle farm, property of José Blain, located at the southern base of the mountains opposite Bahía Honda, Pinar del Río. The boundaries of the farm were the Sierra Rangel to the north, Santa Cruz to the south, the river of the same name to the east and the Taco Taco River to the west. This locality is currently within the municipality of San Cristóbal, province Artemisa, and is part of the biogeographical district Sabaloense (Borhidi 1996).

The name *Thrinax acuminata* was initially used by Sauvalle (1871) for the specimen *Wright 3966*, without description, diagnosis or reference to a previous one, which makes it a *nomen nudum*. Subsequently the name continued to be used in Sauvalle (1873), Gómez de la Maza (1893) and Sargent (1899), but none of them fulfilled Article 38 of the Code. Sargent in Schumann (1901) transferred it to *Coccothrinax*, but this combination continued to constitute a *nomen nudum*. Beccari (1907) first used the name *Coccothrinax acuminata* (based on *Coccothrinax acuminata* Sargent 1899) as a valid name, as it was accompanied by a description and a type designation (*Wright 3966*), although he did not indicate the herbarium in which the type was deposited. In 1972, Glassman reconsidered its taxonomic validity and indicated that, in his opinion, the holotype was deposited in A (herbarium of the Arnold Arboretum, Harvard University).

The type material used for the description that validated *Coccothrinax acuminata* also merits careful analysis. The specimen chosen as the lectotype is K000462859 (*http://specimens.kew.org/herbarium/K000462859*) deposited at Kew (Fig. 3), because Beccari used the material for

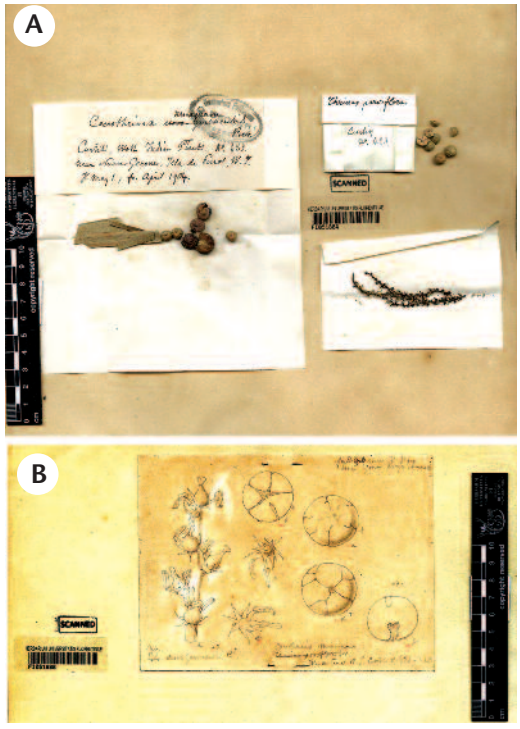
3. Kew specimen of *Wright 3966* with Beccari's handwritten annotation (barcode K 000462859), selected here as lectotype of *Coccothrinax acuminata* Becc. © copyright of the Board of Trustees of the Royal Botanic Gardens, Kew.

his description of the reproductive characters and handwrote an annotation, "*Coccothrinax acuminata* (Sargent) O. Becc III/1907." This same specimen was examined previously by J.D. Hooker, who handwrote on the sheet, "*Thrinax acuminata* Griseb. & Wendl. Cuba 7/[18]71," apparently referring to the *nomen nudum* used by Sauvalle in 1871. This specimen at Kew, with Beccari's handwritten annotation, must be the lectotype of *C. acuminata*. This supersedes all other type designations, such as "isotype of *Coccothrinax acuminata*" on the specimens of *Wright 3966* held at GH (Gray Herbarium of Harvard University). The claim by S.F. Glassman (1972) that the type is a specimen deposited in A is in error; the specimens are present only in GH (GH28253, GH28254 and GH28255) and not in other herbaria of Harvard. Read in 1969 noted as isotypes, with corresponding annotations, duplicates of *Wright 3966* in F, NY and US, while Kellogg annotated those of GH. However, none of them had been indicated as types in any publications. In this article, a total of 19 new isolectotypes are indicated, among which, in addition to those previously mentioned, are those existing in BRU, FI, GH, NY, P and US.

In later years, Beccari (1913), Burret (1929) and Dahlgren (1936) accepted the name *Coccothrinax acuminata*, but León (1939) considered it to be synonymous with *C. miraguama* (Kunth) Becc. var. *miraguama*. Many authors (León 1946, Muñiz & Borhidi 1982, Henderson, Galeano & Bernal 1995, Moya & Leiva 2000, Govaerts & Dransfield, 2005, Govaerts et al. 2011, Acevedo Rodríguez & Strong 2012, Greuter & Rankin, 2016) followed León (1939).

On the other hand, Beccari (1913) used the designation *Coccothrinax miraguano* (*novo-geronensis*), without specifying infraspecific rank, for flower and seed drawings of the specimen *Curtiss 423,* although he did not clarify the herbarium he consulted. It is assumed that the specimen is present in his herbarium at FI (Natural History Museum, Florence, Italy). He accompanied all this with

4. *Coccothrinax miraguama* var. *novo-geronensis* Becc. **A**. *Curtiss 423* with Beccari's handwritten annotation (barcode FI 051884), selected here as lectotype. **B**. Original drawings for Figure 169 in Beccari (1913). © copyright of the Natural History Museum of Florence.



5. Vegetation at Los Indios, Isla de la Juventud, with *Coccothrinax acuminata*. Photo by Michael Calonje.

a diagnosis in which he pointed to the "almost sessile" flowers of this palm from the Isla de Pinos (currently Isla de la Juventud) as the feature differentiating it from *C. miraguano* from mainland Cuba. Beccari (1931) transcribed this name as a variety.

León (1939), although he mentioned Beccari (1913), was unaware of Dahlgren's (1936) designation and indicated *Curtiis 423* as one of the paratypes of *C. miraguama* var. *arenicola* León, described in his work. Glassman (1972) accepted Dahlgren (1936) and indicated the duplicate deposited in US as holotype, a criterion not shared by the authors of this article, as explained later. Henderson, Galeano and Bernal (1995) considered *Coccothrinax miraguama* var. *novo-geronensis* Becc. as a synonym of *Coccothrinax miraguama*, but the taxon has been ignored by all the following authors: Burret (1929), León (1946), Muñiz & Borhidi (1982), Moya and Leiva (2000), Govaerts and Dransfield (2005) and Govaerts et al. (2011), Acevedo Rodríguez and Strong (2012) and Greuter and Rankin (2016).

To designate the lectotype of *Coccothrinax miraguano* var *novo-geronensis*, priority was given to samples deposited in FI, where Beccari carefully studied *Coccothrinax* materials from the West Indies. The specimen *FI 051884* is designated as a lectotype, which Beccari (1913) used for the diagnosis and drawings (Fig. 4). The statement made by Glassman (1972) is rejected, because there is no evidence that the US duplicates were reviewed by Beccari; moreover, to be a holotype, the specimen would have to have cited explicitly by Beccari, which it was not. None of the 17 duplicates of *Curtiss 423*, deposited in CM, FI, HAC, K, LE, M, MO, NY, and US, had been previously mentioned as part of the typological material of *Coccothrinax miraguama* var. *novo-geronensis* Becc.

Finally, *Coccothrinax miraguama* var. *arenicola* was described by León (1939), who quotes in the protologue three specimens from the same locality: *León 16146*, *León 16147* and *León 16148*, without designating a holotype. León himself (1946) named it as a variety, nevertheless Borhidi and Muñiz (1971) changed the rank to subspecies. Subsequent authors have followed three different points of view: 1) Those who continued to consider it as a variety (Glassman, 1972 and Acevedo Rodríguez & Strong, 2012). 2) Those who placed it in the subspecies rank (Muñiz & Borhidi 1982, Moya & Leiva 2000, Govaerts & Dransfield 2005, Govaerts et al. 2011, Greuter & Rankin 2016). 3) Those who did not recognize its taxonomic validity and considered it as a synonym of *Coccothrinax miraguama* (Kunth) Becc. (Henderson, Galeano & Bernal 1995).

To designate the lectotype for *Coccothrinax miraguama* var. *arenicola*, priority was given to the materials cited in the protologue belonging to LS (currently in HAC), as it is the herbarium where Brother Leon worked during his entire professional stay in Cuba. It designated as lectotype *León 16146* [HACLS4387], on whose label León wrote "type." The numbers: *León 16147* [HAC-LS4386], used to describe flowers and *León 16148* [HAC-LS4385], remain only as paratypes. None of the seven duplicates of *León 16146,* in HAC-UO and US, had been previously been mentioned as part of the type material of *Coccothrinax miraguama* subsp. *arenicola* (León) Borhidi & O.Muñiz.

According to the above, the proposed nomenclature for the taxa analyzed is as follows:

Coccothrinax acuminata Becc., Webbia. 2: 313 (1907). *Thrinax acuminata* Griseb. & H. Wendl., in Sauvalle, Anales Acad. Ci. Med. Habana, 8: 563 (1871), *nom. nud.* Type. CUBA. [Provincia Artemisa, municipio San Cristóbal], Balestena. ft., 23. Feb. [1862 or 1864]. *Wright 3966* (lectotype, here designated, K 000462859 [photo!];

isolectotypes, here designated: BRU 55644 [photo!], BRU 55645 [photo!], V 92098F1 [photo!], V 92098F2 [photo!], V 92098F3 [photo!], FI 51879 ex K [photo!], GH 28253 [photo!], GH 28254 [photo!], GH 28255 [photo!], K 462858 [photo!], NY 73060 [photo!], NY 73076 [photo!], NY 73077 [photo!], NY 73078 [photo!], NY 73079 [photo!], P 725688 [photo!], P 725689 [photo!], US 87368 [photo!], US 87369 [photo!]).

Coccothrinax miraguama var. *novo-geronensis* Becc., Ann. Roy. Bot. Gard. Calcutta 13: 336 (1931). *Coccothrinax miraguama* [without rank] (*novo-geronensis*) Becc., Pomona Coll. J. Econ. Bot. 3: 409 (1913), **synon. nov**. Type. CUBA. [Municipio Isla de la Juventud], dry ground of poor quality near Nueva Gerona, Isla de Pinos, W.I., April [ft.]-1 May [fl.] 1904, *Curtiss 423* (lectotype, here designated, FI 051884 [photo!]; isolectotypes, here designated: CM 422028 [photo!], CM 422029 [photo!], G 305367 [n.v.], K 632580 [photo!], K 632581 [photo!], LE 793 [photo!], HAC!, M 208181 [photo!], MO 559592 [n.v.], MO 559593 [n.v.], NY 1661902 [photo!], NY 1662094 [photo!], NY 1662095 [photo!], NY 1662105 [photo!], US 14965 [photo!], VT117062 [photo!], MO 559592 [n.v.], MO 559593 [n.v.]).

Coccothrinax miraguama subsp. *arenicola* (León) Borhidi & O.Muñiz, Bot. Közlem. 58: 175 (1971). *Coccothrinax miraguama* var. *arenicola* León, Mem. Soc. Cub. Hist. Nat. "Felipe Poey'" 13: 114 (1939), **synom. nov**. Type: CUBA. [Provincia Pinar del Río, municipio Guane], sabana arenosa, hacienda Sabanalamar, El Sábalo (Pinar del Río), ft., 20. Aug. 1934, *León 16146* (lectotype, here designated, HAC-LS4387!; isolectotypes, here designated: HAC-UO1!, HAC-UO2! HAC-UO3!, US14992 [photo!], US14993 [photo!], US14994 [photo!], US14995 [photo!]).

Specimens examined: CUBA. Other specimens examined to which the identification is updated as *Coccothrinax acuminata*. The number of duplicates of each specimen in the same herbarium, is indicated in brackets.

Palmer 877 US [photo!]; *Shafer 299* HAC!, CM [photo! 3×], NY [photo! 2×]; *Baker 4808* HAC!, FI [photo!]; *Hermann 587* NY [photo!]; *Hermann 714* HAC!, FI [photo!]; *Hermann 839* HAC! [2×], FI [photo!]; *Jennings 156* NY [photo!], CM [photo! 2×]; *Jennings 623* CM photo!]; *Britton 6652* NY [photo! 2×], US [photo!]; *Britton 9748* NY [photo! 2×], US [photo!]; *Britton 10089* NY [photo! 2×]; *Britton 14227* CM [photo!], NY [photo!], US [photo! 2×]; Shafer 10561 NY [photo! 2×], US [photo!]; Shafer 10921 NY [photo! 2×], US [photo! 2×]; *Hermann 7909*, HAC! [5×]; *Hermann s.n.* HAC! [2×]; *León 16147* HAC!; *León* 16148 HAC!; León *16150* HAC!; *León 17034* HAC! [3×], US [photo! 2×]; *León 17035* HAC!, US [photo! 2×]; *León 17466* HAC!; *León 17467* HAC!; *León 18596* HAC!); *León 18734* HAC!; *León 18851* HAC!; *Killip 32239* US [photo! 2×]; *Acuña 19849* HAC! [2×]; *Alain 6913* HAC!; *Verdecia RV12/23* HMC [photo! 2×]; *Verdecia RV12/24* HMC [photo! 3×]; *Verdecia RV12/28* HMC [photo! 3×], NY [photo! 4×]; *Verdecia RV12/35* HMC [photo! 2×], NY [photo! 4×].

Notes: The species *Coccothrinax acuminata* belongs to subsection *Coccothrinax* of section *Coccothrinax*, according to the classification of Muñiz and Borhidi (1982), and Miraguama complex of the Pauciramosa Group, according to the informal classification of Nauman and Sanders (1991).

Distribution: Provinces Artemisa, municipality San Cristóbal; and Pinar del Río, municipalities Consolación del Sur, Guane, Mantua, Pinar del Río, Sandino, San Juan y Martínez y San Luis, (León 1939, Urquiola et al. 2001), and municipality Isla de la Juventud (León 1939).

Biogeography: Western Cuba subprovince, district *Guanahacabibense* (sector *Peninsularicum*), districts *Geronense, Indionense, Pinarense* and *Sabaloense* (sector *Pinaricum*) and district *Viñalense* (sector *Rosaricum*) (Borhidi 1996).

Habitat: The species grows in secondary savannas, seminatural savannas, coastal and subcoastal thorny shrublands and pine forest, on sandy-quartzite substrate, mainly on white sandy soils (Fig. 5 & Front Cover), alluvial soils and rarely on limestone.

Vernacular names: *Guanito* and *miraguano* (León 1939), *yuraguana* (González-Oliva et al. 2015).

Conservation status: Least Concern (LC) *sensu* González-Torres et al. (2016) for the categorization of *Coccothrinax miraguama* subsp. *arenicola*. According to González-Oliva et al. (2015), present in Guanahacabibes National Park, in the Los Indios and Los Pretiles Ecological Reserves, in the Sierra de Contadores-Cayo Ratones and San Ubaldo-Sabanalamar Managed Floristic Reserves, in the La Cañada Managed Resource Protected Areas and in the Península de Gunahacabibes Biosphere Reserve. León (1939) reported

damage to populations by periodic fire and cutting by the *campesinos*, who use the leaves. González-Oliva et al. (2015) reported that it is used for rustic constructions.

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