

A New and Endangered Species of *Astrocaryum* (Arecaceae) from Colombia

JUAN CARLOS COPETE
*Maestría en Bosque y
Conservación ambiental,
Universidad Nacional de
Colombia sede Medellín
Colombia*
jccopetem@unal.edu.co

AND

RODRIGO CÁMARA-LERET
*Identification and Naming
Department,
Herbarium,
Royal Botanic Gardens Kew,
Richmond, Surrey, TW9 3AE,
UK.*
R.CamaraLeret@kew.org

To honor peace in Colombia, this new species is named *Astrocaryum pax*.

After the 2018 Peace treaty between the Colombian government and the Revolutionary Armed Forces of Colombia (FARC), many areas have become accessible to botanists. In a recent expedition to northeast Antioquia a new palm species in the genus *Astrocaryum* was discovered. Here, we provide a description of the species, photographs, distribution map and IUCN Red List assessment.

***Astrocaryum pax* Copete & Cámara-Leret sp. nov.** Palm with aerial stem covered by decaying leaves, differing from other species in the combination of inflorescence peduncle 2 m long, 2–4 pistillate flowers per rachilla, pistillate flowers with black spines, staminate flowers with 6 stamens and fruit epicarp with white indument and small spines. Type: COLOMBIA, ANTIOQUIA: Corregimiento de Buenos Aires. 6°47'52.2" N; 74°34'57.3" W, 418 m, 23 March 2019, *Juan Carlos Copete*

Maturana 52 (holotype: JAUM; isotype: JAUM); (Figs. 1–8).

Stem solitary, up to 3 m tall, 35 cm in diameter or acaulescent, covered by bases of decaying leaves. *Leaves* 10–18, pinnate, erect, 5–8 m long, forming a funnel where leaves from other plants accumulate; petiole up to 150 cm long, 4 cm wide, adaxially ribbed and without spines, abaxially rounded with brownish hairs and numerous wide black spines in groups of 3–5, to 19 cm long and 1 cm wide, easily broken; pinnae 91–121 per side and inserted in one plane, undersurface white with marginal spines; basal pinnae 81–111 cm long, 2–4 cm wide; mid-leaf pinnae 91–115 cm long, 3–5 cm wide; apical pinnae 27–39 cm long, 1–2 cm wide. *Inflorescence* interfoliar, erect, bisexual; peduncular bract 68 cm long, 12 cm wide, inserted 1.5 cm above the peduncle base and densely covered by black or yellow spines



1. Habit of *Astrocaryum pax*.

up to 4 cm long; rachillae densely covered at the base with brown spines and white indument, 17 cm long and 5 mm wide. *Pistillate flowers* 2–4 at the base of the rachilla, forming a triad (one pistillate flower surrounded by two staminate flowers), cream colored, 20 mm long and 5 mm wide; calyx 4 mm long and 3 mm wide, cup-shaped, covered by small brown spines; corolla 5 mm long and 3 mm wide, cup-shaped and covered by small brown spines; stigmas 3, 4 mm long and 3 mm wide, covered by white indument and with black spines. *Staminate flowers* towards the apex of the rachillae, cream coloured, 3 mm long and 1 mm wide, lacking spines, immersed in a cup-like structure, separated by white filaments; stamens 6. *Infructescence* interfoliar, 3 m long, peduncle 2 m long and 3 cm wide, with black spines to 1 cm long and brown trichomes, with a scar at the end of the peduncle; rachis 46 cm long; rachillae up to 100, 14 cm long and 0.5 cm wide, covered by black spines and white indument, each rachilla subtended by a black triangular and glabrous bract, 5 mm long and 3 mm wide. *Fruits* 6 cm long and 3 cm wide, nearly round, brown when immature, becoming orange at maturity;

epicarp covered in white indument and small black spines to 33 mm long; sepals and petals (perianth) persistent, corolla cup-shaped and covered by small spines 22 mm long at the apex; fruit with 3 locules and ending in a brown beak 1 cm long.

Etymology: *Astrocaryum pax* is named in honour of the peace treaty signed in 2016 between the government of Colombia and the Revolutionary Armed Forces of Colombia (FARC), which has enabled the scientific exploration of previously inaccessible forests.

Common names: *Palma estera*, but this name is likely a misnomer, as it is widely used for the more common *A. malybo* H. Karst.

Distribution: Known only from the type locality in forest remnants in northeast Antioquia, Remedios Municipality, in the middle Magdalena River valley (Fig. 9). The species grows in humid tropical forests on well-

2. Leaf and infructescence of *Astrocaryum pax*.





3. Comparison of the leaves of three *Astrocaryum* species that grow together in the study area. From left to right: *A. malybo*, *A. pax* and *A. triandrum*.

drained soils at 250–500 m. One population of 60 individuals was found in different stages of development (from seedlings to adults), co-occurring with 70 adult individuals of *Astrocaryum malybo* and 120 adult individuals of *A. triandrum* G. Galeano, R. Bernal and F. Kahn.

Conservation status: *Astrocaryum pax* is known only from the type locality, which consists of a mosaic of intact and logged forests used for livestock pastures. The proximity of gold mining and the construction of a powerline connection project make it likely that the species habitat will continue to decline. More surveys are recommended to assess if the species occurs in other patches and how abundantly. Our field surveys indicate it has an estimated Extent of Occurrence (EOO) of <math><100\text{ km}^2</math> and an Area of Occupancy (AOO) of <math><10\text{ km}^2</math>, which would fall within the threshold for Critically Endangered under criterion B1/B2 (IUCN 2011). If found in more forest patches, EOO could increase to 100–

20,000 km² and AOO could increase to 500–2000 km² on the basis of the area of forests in the region. Given this high degree of uncertainty, the species could be assessed under criterion B1 as Critically Endangered, Endangered or Vulnerable (IUCN, 2011). Taking a precautionary approach and given the species small EOO and threats to its forest habitat, we assess the species as Endangered B1ab (iii).

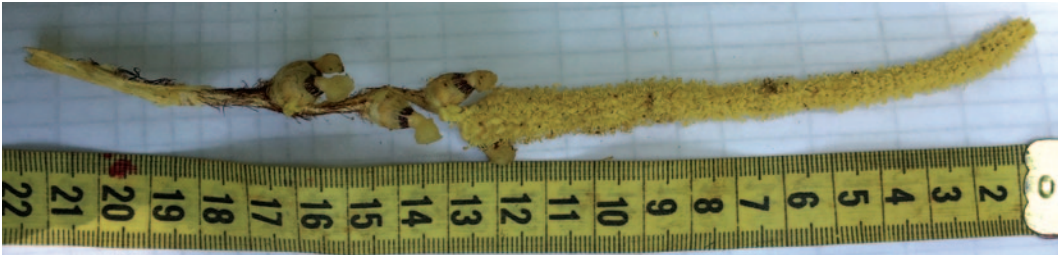
Notes: *Astrocaryum pax* belongs to subgenus *Monogynanthus* Burret (Kahn 2008) on the basis of having fruits covered with white indument and small black spines. There are three other *Astrocaryum* species in the subgenus, but these grow in the Guyana shield: *A. farinosum* Barb. Rodr, *A. sciophilum* (Miq.) Pulle, and *A. sociale* Barb. Rodr. (Kahn 2008, Roncal et al 2013). *Astrocaryum pax* differs from these species in having more numerous pinnae: 91–121 pinnae vs. 57–81 in *A. farinosum*, 51–70 in *A. sciophilum* and 64–82 in *A. sciophilum* (Kahn 2000). *Astrocaryum pax* also has smaller



4. Infructescences from left to right: *Astrocaryum malybo*, *A. triandrum* and *A. pax*.



5. Inflorescence of *Astrocaryum pax*.



6. Rachilla of *Astrocaryum pax* with basal female and distal male flowers.

pistillate flowers: 10 mm long and 3 mm wide, vs. 12.5×12.2 mm in *A. farinosum*, 13.3×18.8 mm in *A. sciophilum*, and 8.8×13.1 mm in *A. sociale* (Kahn 2000).

Compared with other *Astrocaryum* species at the type locality, *A. pax* differs from *A. malybo* by having rachillae, pistillate flowers and fruits covered with spines vs. spines lacking in *A. malybo*. It differs from *Astrocaryum triandrum* by having 6 stamens in the staminate flowers and branched infructescences with 2–4 fruits at the base of the rachillae (vs. 3 stamens and 1 fruit at the base of the rachillae, which arise directly from the peduncle in *A. triandrum*) (Table 1).

Finally, the Amazonian *Astrocaryum ciliatum* F.Kahn & B.Millán could be confused with *A. pax*, but *A. ciliatum* does not grow in the study area, has one pistillate flower per rachilla (vs. 2–4 pistillate flowers per rachillae in *A. pax*) and lacks white indument and black spines in the prophyll or fruit epicarp (Kahn 2008).

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7. Fruits from left to right: *Astrocaryum triandrum*, *A. malybo* and *A. pax*.





8. Endocarps from left to right: *Astrocaryum pax*, *A. triandrum* and *A. malybo*.

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9. Map of the type locality of *Astrocaryum pax* in Colombian middle Magdalena valley. Source: Google Earth.



Table 1. A comparison of *Astrocaryum malybo*, *Astrocaryum triandrum* and *Astrocaryum pax*.

	<i>A. malybo</i>	<i>A. triandrum</i>	<i>A. pax</i>
Leaves	15–20	6–12	15–18
Leaf length (m)	3	5	7
Petiole length (m)	ca. 1	0.05–0.09	1–2
Inflorescence peduncle length (m)	1	0.56–0.78	2
Rachis length (cm)	15	15–18	46
Rachillae	100–110	100–120	up to 100
Rachillae length (cm)	11, lacking spines	8–12, with yellow spines	14 cm long, with brown spines at the base
Pistillate flowers	2–4, not sessile, without spines	1, sessile, with spines	2–4, not sessile, with spines
Stamens	6	3	6
Sepals & petals persistent in fruit	not forming a cup, lacking spines	forming a cup, black spines at the apex	forming a cup, black spines at the apex
Fruits	in lax raceme, yellow when immature, becoming violaceous or nearly black when mature	in compact raceme resembling a cob, brown when immature, orange when mature	in lax raceme, brown when immature, orange when mature
Epicarp	smooth, without indument or spines	covered by white indument and black spines to 1.5 cm long	covered by white indument and black spines to 0.33 cm
Beak	black, 3.5–4 cm long	green, 1 cm long	brown, 1 cm long