



Seven New Species of *Areca* (Arecaceae)

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Abstract

Seven species of *Areca* (Arecaceae) are here described as new: *Areca bakeri*, *A. churchii*, *A. dransfieldii*, *A. gurita*, *A. mogeana*, *A. riparia* and *A. triginticollina*. Five of the species are endemic to Borneo, one to Sumatra and one to Cambodia. A discussion of morphological characters, such as habit, leaf structure, inflorescence architecture and floral structure is presented for the species and putative relatives. Distribution, ecology, habitat, uses and conservation status are also discussed.

Key words: Palmae, palms, South-East Asia, taxonomy

Introduction

The palm genus *Areca* Linnaeus (1753: 1189) is distributed from India and South China through Malesia to New Guinea and the Solomon Islands (Dransfield 1984, Dransfield *et al.* 2008), and contains approximately 50 species (Henderson 2009). Since the last revision of the entire genus by Furtado (1933), concepts of generic limits and relationships have been modified and tested phylogenetically (Dransfield 1984, Govaerts & Dransfield 2005, Loo *et al.* 2006, Dransfield *et al.* 2008, Baker *et al.* 2009, 2011), and a number of new species have been described (Heatubun 2008, Henderson *et al.* 2010). A full account of the genus is currently in preparation with the aim of critically assessing Furtado's treatment and the work that has followed it in the light of new materials and data now available.

As a result of recent field trips to Borneo and herbarium visits (K, L, SAR), the author discovered a seven new species, five of which are endemic to Borneo (*Areca bakeri*, *A. churchii*, *A. dransfieldii*, *A. gurita*, *A. mogeana*), whereas *A. triginticollina* and *A. riparia* are known only from Sumatra and Cambodia respectively. For the time being, these new taxa are not placed in an infrageneric classification because the subgenera and sections of Furtado (1933) are currently the subject of a molecular systematic study, which, it is anticipated, will result in the new species being placed within a revised generic classification.

Taxonomic Treatment

Areca bakeri Heatubun, *sp. nov.*

A ceteris speciebus Borneensibus habitu acaule-caespitoso, petiolis longis 100–105 cm, inflorescentia erecta rigida, floribus staminatis distichis, floribus foemineis singulariter dispositis distincta.

Type:—CULTIVATED. Borneo, Sarawak: Cultivated at the Semengoh Forest Arboretum, 22 April 1996, Baker *et al.* 716 (holotype K!, isotypes KEP, SING, SAR!).

Undergrowth palmlet densely clustering with ca. 20 stems in a clump to 1 m in height. Stem subterranean to very short (to 1 cm), ca. 2 cm diam.; internodes very close (0.5–1 cm long), not conspicuous, covered by marcescent leaf sheaths. Leaves 4–6 in crown, litter trapping, pinnate, 140–200 cm long (excluding petiole); sheath tubular, 20–31 cm long and 3–4 cm wide, smooth, not fibrous, yellowish green; crown shaft not well defined, up to 40 cm long and up to 4 cm diam.; petiole 100–105 cm long, channelled adaxially, rounded abaxially; rachis ascending but not arching, with adaxial longitudinal ridge, rounded abaxially; blade with slightly irregularly arranged leaflets, 7–8 leaflets on each side; basal leaflets ca. 52×6.4 –14 cm, with 7–9 folds, sigmoid, the middle leaflets 57 – 59×4.5 –10 cm, with 5–9 folds, slightly sigmoid and the terminal leaflets ca. 42×11 cm, with up to 11 folds, slightly sigmoid, tips pointed except for the terminal leaflets slightly oblique-lobed, papery, discolourous, darker adaxially than abaxially. Inflorescence infrafoliar, erect, bursting out among marcescent sheaths, 20–26 cm long and 4.5–12.5 cm wide, protandrous, branching to 1 order; prophyll elongated, up to 26 cm long, ca. 3 cm wide, two-keeled, leathery, cream, light green near the apex; peduncle 6–10 cm long, pale yellowish green; rachis yellowish green; rachis bracts caducous; rachillae 11–13, 8.5–14 cm long and 3.5–5.6 mm wide, very stiff, stout and straight, slightly swollen and flattened near the base, pale green, elongate. Floral clusters distichous on rachillae, only one complete triad including female flower occurring at the base of each rachilla. Staminate flowers small, sessile, triangular, ca. 6.2×3.1 mm, asymmetric; sepals 3, low; petals 3, triangular, small, striate; stamens 6, small, anthers shorter than the filaments; filaments slender, elongate; pistillode ca. 2.5×1.0 mm, pointed. Pistillate flowers larger than the staminate, triangular, borne on the enlarged basal portion of rachillae, only one flower on each rachillae, buds varying greatly in size depending on stage of development, ca. 17 mm long and 8 mm wide in late anthesis; sepals 3, strongly imbricate, ca. 7×7 mm, triangular, asymmetrical, striate; petals 3, imbricate, triangular, ca. 12.5×6.5 mm, striate; gynoecium ca. 10.5 mm long and 4 mm wide at the base; stigma ca. 8 mm long, pointed with 3 lobes, split 8 mm to the base; style ca. 1.5 mm long; staminodes ca. 6, irregularly dentiform, 0.5 – 1×0.25 –0.5 mm. Fruits elongate, sickle-shaped, 6.0–6.5 \times 1.3–1.45 cm (young fruits), beak 1.4–1.5 mm; epicarp smooth, shiny, dark green (young), mature fruits not known. Seed very young; endosperm sparsely ruminant. (Figures 1 & 2).

Distribution:—Only known from very limited collections from Miri (4th) Division of Sarawak in northern Borneo and from a plant cultivated in Semengoh Forest Arboretum near Kuching.

Habitat:—This species grows in primary mixed dipterocarp forest in river valleys at about 42 m above sea level.

Local names:—Not recorded.

Uses:—Traditional uses are not known. However, the palm has potential as an ornamental.

Conservation status:—Critically Endangered (CR B2ab). This palm meets the criteria for the threat category “Critically Endangered” (IUCN 2001) because it is known only from one locality at Ulu Anap, Tatau, Miri, Sarawak and its area of occupancy is estimated to be less than 10 km². In addition, rain forest is highly threatened in general in Sarawak, for example due to logging activities and oil palm plantation, and thus a decline in extent of occurrence, area of occupancy and quality of habitat is inferred. One clump of this palm has been successfully established and fruits in Semengoh Forest Arboretum as part of the *ex situ* conservation program run by Biodiversity Research Centre, Sarawak Forestry Corporation (previously known as Sarawak Forestry Institute).

Etymology:—This new *Areca* is named after Dr. William J. Baker, the Head of Palm Research at the Royal Botanic Gardens, Kew and the collector of the type specimen.

Additional specimens examined:—MALAYSIA. Borneo, Sarawak: Miri (4th) Division, Tatau, Ulu Anap, 22 June 1982, *Mokhtar & Othman S 44726* (K!, L!, KEP, SAN, SAR!). CULTIVATED. Borneo, Sarawak: Semengoh Forest Arboretum, 01° 24.059' N 110° 19.423' E, 31 March 2008, *Heatubun & Kuda 903* (K!, SAR!).



FIGURE 1. *Areca bakeri*. A. Apical portion of leaf. B. Middle portion of leaf. C. Basal portion of leaf and petiole attached to crown shaft. D. Inflorescence attached to stem just below the crown shaft and showing acaulescent habit. E, F. Staminate flower whole and in section. G. Pistillate flower. Scale bar: A, B = 8 cm; C, D = 3 cm; E, F = 2.2 mm; G = 7 mm. A–D from *Baker et al.* 716; E–G from *Mokhtar & Othman S 44726*. Drawn by Lucy T. Smith.

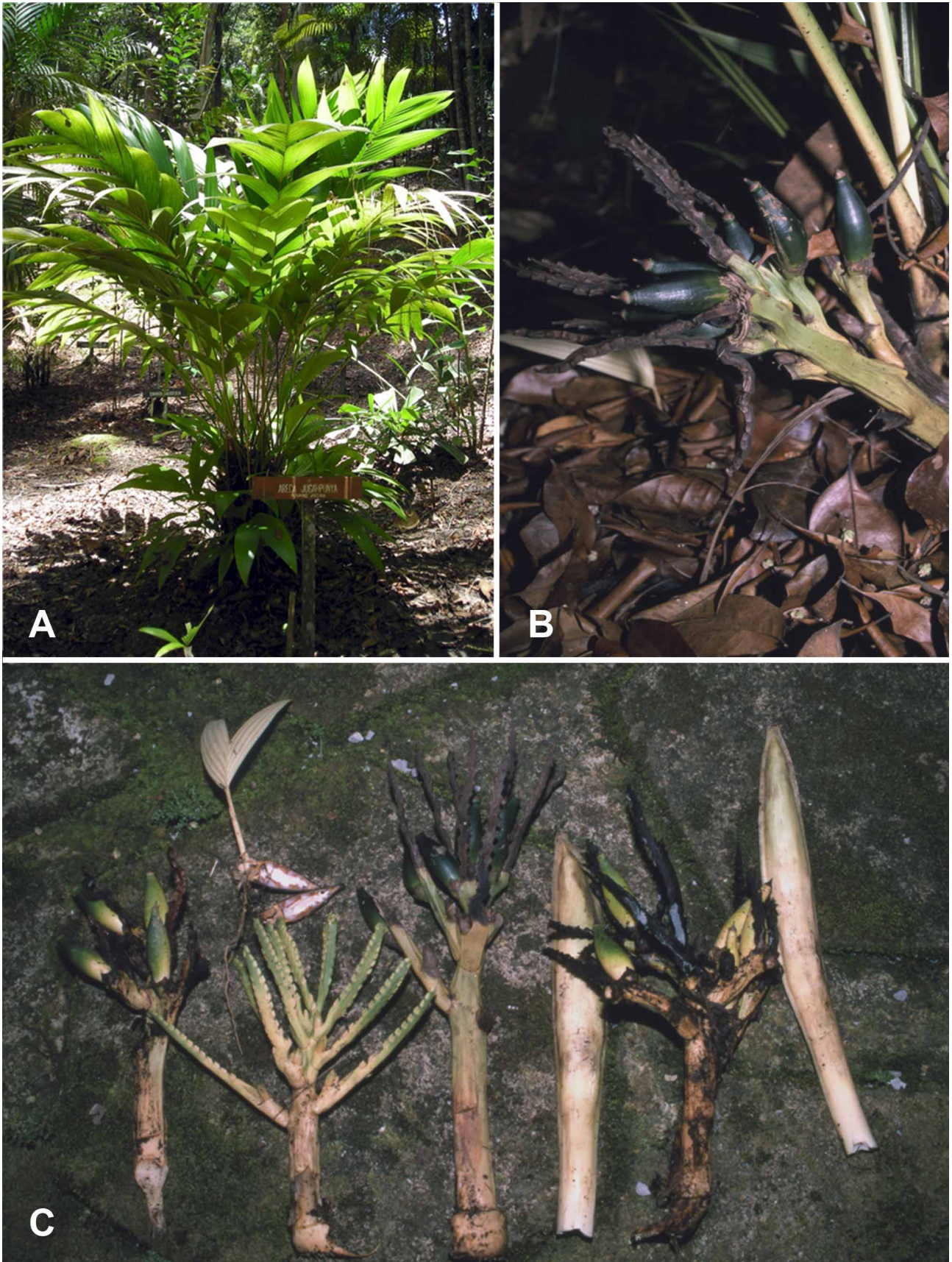


FIGURE 2. *Areca bakeri*. A. Acaulescent habit with densely suckering clump; the palm was mis-identified as *A. jugahpunya*, as shown on the label. B. Inflorescence bursting out from the marcescent leaf sheaths. C. Prophyll, inflorescence, infructescence and seedling. All photos were taken from the specimen cultivated at Semengoh Forest Arboretum near Kuching, Sarawak, Malaysia. Photos: A (Charlie D. Heatubun), B–C (John Dransfield).

Discussion:—*Areca bakeri* is similar to *A. jugahpunya* Dransfield (1984: 13) in its acaulescent, clustering habit and broad leaflets, but can immediately be distinguished by the densely clustering habit with ca. 20 stems in the clump, very long and slender petioles, leaflets more papery and the tips of terminal leaflets slightly obliquely lobed. The inflorescence of *A. bakeri* is more similar to *A. dransfieldii* than to *A. jugahpunya*, especially with its swollen-flattened rachillae and only one pistillate flower on each rachilla. However, *A. bakeri* is easily distinguished from *A. dransfieldii* by its acaulescent litter-trapping habit, leaves with very long petioles (100–105 cm) and broad leaflets, and infrafoliar inflorescences borne among marcescent leaf sheaths with somewhat long peduncles. In contrast, *A. dransfieldii* has conspicuous stems with aerial branching, leaves with long petioles (25–81 cm) and numerous finely-regular leaflets, and infrafoliar inflorescences with short peduncles.

***Areca churchii* Heatubun, sp. nov.**

Palma solitaria, caude gracillimo, inflorescentia fortiter effusa, floribus staminatis spiraliter dispositis, sepalis elongatis, staminibus 11–12, filamentis interdum tortilis et circinatis, floribus foemineis semper singulis in rachillis, 1–2 cm longioribus in rachillis basaliter dispositis, differt.

Type:—INDONESIA. Borneo, West Kalimantan Province: Serawai, Sungai Merah, 2 km to W of camp along Gaharu trail towards Sungai Labang, surrounding ridges and valleys, February 1995, *Church et al. 2083* (holotype K!, isotypes BO!, A).

Solitary, slender, undergrowth palmlet. Stem up to 2 m tall, ca. 2 cm diam.; internodes 1–2 cm long. Leaves ca. 8 leaves in crown, pinnate, 95–115 × 65–90 cm long; sheath tubular, not fibrous, up to 20 cm long, striate; crown shaft well defined, 30–40 cm long, 3 cm diam.; petiole up to 65 cm long, channelled adaxially, rounded abaxially, 5–6 mm wide and 6–7 mm thick; rachis with adaxial longitudinal ridge, rounded abaxially; blade with irregularly arranged leaflets, 5–7 leaflets on each side, 3–11 cm spacing between leaflets, leaflets with 2–7 folds, leaflets near petiole ca. 46.5 × 1.5 cm, slightly sigmoid and tip oblique-lobed, middle leaflets 47–51 × 5–5.5 cm, and terminal leaflets about 33 × 7 cm, tips bifid with lobes 0.5–2 cm depth, papery, dark adaxially and pale abaxially when dried. Inflorescence infrafoliar, erect, 20–25 × 14–24 cm at anthesis, protandrous, branching to 1 order; peduncle 2–2.2 cm long, prophyll not seen; rachis pale yellow at the base and peach-coloured towards the apex and light brown when dried; rachis bracts caducous; rachillae 13–17, 12–20 cm long, slender, spreading, covered by minute light brown to chocolate-brown indumentum, elongate, sinuous to slightly zigzag in appearance. Floral clusters spirally arranged on the rachillae, only one complete triad including a female flower occurring near the base of each rachilla. Staminate flowers relatively large, triangular, elongate, 8.5–10 × 2–2.5 mm, asymmetric, sessile; calyx cup-shaped, 1.5–2.3 mm wide and 2 mm high, 3-lobed, the lobes ca. 1.25 × 0.5 mm; petals 3, valvate, elliptic to slightly spatulate, ca. 7.7 mm long and 1.8 mm wide at anthesis, connate at the base, cream-coloured; pistillode lacking; stamens 11–12, 5–6.5 mm long, elongate, basifixed; anthers 2.5–3.5 mm long and 0.3 mm wide after anthesis, cream-coloured; filaments 2–3.5 mm long and 0.2 mm wide, dark brown, sometimes twisted and coiled, free near corolla and connate at the centre. Pistillate flowers larger than the staminate, triangular, 11.8–15 × 6.7–7.1 mm, only one flower on each rachilla, positioned 1–2 cm from the base of rachilla; sepals 3, imbricate, triangular, striate, 7–9 mm long and 6 mm wide at anthesis; petals 3, imbricate, triangular, striate, ca. 10 × 5 mm; gynoecium 13 × 4 mm at anthesis, tubular shaped; stigma trifid, 4 × 4 mm; style 9 mm long, 4 mm wide; staminodes lacking. Fruits very young, dull green and yellow at the base, mature fruits not seen. (Figure 3).

Distribution:—Only known from the type of locality in Sungai Merah, Serawai, West Kalimantan Province of Indonesia.

Habitat:—This species grows on hill slopes above the perennial stream of Sungai Labang in Dipterocarp forest in association with *Shorea*, *Dipterocarpus*, species of *Lauraceae* and *Sapotaceae*.

Local name and uses:—Not recorded.