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A new species of betel nut palm (*Areca:* Arecaceae) from western New Guinea

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Abstract

A new species of betel nut palm, *Areca unipa*, is described and illustrated here for the first time. This is the second species of *Areca* from New Guinea that is closely related to the widespread, cultivated species *A. catechu*. A discussion of its morphological characters, distribution, ecology, habitat, uses and conservation status is provided.

Key words: Arecaceae, Palmae, palms, New Guinea, taxonomy

Introduction

Botanical exploration in New Guinea continues to yield novelties, even in the well-known groups of plants such as palms. Since the Palms of New Guinea (PONG) Project (Baker 2002) was initiated in 2000, more than 50 new species have been described (e.g. Baker & Heatubun 2012, Baker *et al.* 2006, Banka & Baker 2004, Banka & Barfod 2004, Barfod & Heatubun 2009, Dransfield *et al.* 2000, Heatubun 2008, Heatubun & Barfod 2008, Heatubun *et al.* 2009) and at least one new species has been discovered on almost every field trip. Here we describe a new species of the betel nut palm genus *Areca* (Arecaceae), which has been lately discovered in New Guinea despite the recent completion of a monograph of the genus in East Malesia (Heatubun *et al.* 2012).

Taxonomic Treatment

Areca unipa Heatubun, *sp. nov.*

Type:—INDONESIA. West Papua Province: Maybrat Regency, East Aifat District, Ayata village, PT. Bima Cakrawala Nusantara Mining Concession Area, 200 m elev., 1°17'08.66" S, 132°37'28.02", 17 July 2011, *Iwanggin & Simbiak* 138 (holotype MAN!, isotype K!).

Diagnosis:—This new species is similar to *Areca catechu* L. and *Areca mandacanii* Heatubun in habit and inflorescence structure, but differs by having fewer leaves in the crown, by the slender leaf rachis and relatively long petiole, and the sigmoid multifold leaflets and broadly wedge-shaped terminal leaflets.

Solitary, slender palm tall up to 12 m high. Stem ca. 7.5 cm diam.; internodes 3–16 cm long, leaf scars 1–1.5 cm wide, not conspicuous, green near crown and dark to brownish grey near the base. Leaves 7 in crown, pinnate, ca. 119 cm long (including petiole); sheath tubular, ca. 54 cm long and ca. 7 cm wide, smooth, not fibrous, shiny cream to light green become dull green; crownshaft well defined, up to 75 cm long and up to 7 cm diam.; petiole ca. 16.5 cm long, slightly channelled adaxially, rounded abaxially; rachis slender, ascending but not arching, with adaxial longitudinal ridge, rounded abaxially; 9−10 leaflets on each side, more or less regularly arranged, spaced by 9–15 cm, basal leaflets ca. 42 × 1−4 cm, with 3 folds, sigmoid, middle leaflets

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41−44 cm long, 1.5−2.5 cm wide at base and 7.5–11 cm wide at the tip, with 5 folds, sigmoid, terminal leaflet pair 14 cm long, 2–4 cm wide at the base and 4–7 cm at the tip, with 3–6 folds, broadly wedge-shaped to slightly cuneate, notched tips, the second and third leaflet pairs below the terminal pair splitting between the folds to about half way to the base, papery, discolorous, darker adaxially than abaxially. Inflorescence infrafoliar, slender, 30−40 cm long and 10−15 cm wide, protandrous, branching to 2 orders; prophyll elongated, slender, up to ca. 26 × 2 cm (very young stage), two-keeled, leathery, cream, light green near the apex; peduncle 1−4.5 cm long, green with numerous stellate hairs; rachis cream to yellowish green with thick rusty brown indumentum of stellate hairs; rachis bracts caducous; rachillae up to 21 cm long and 1−4 mm wide, slender, pale green, elongate and sinuous near the base; floral clusters distichous on rachillae, only one complete triad including female flower occurring at the base of each rachilla, remaining clusters comprising very few paired and solitary staminate flowers. Staminate flowers small, sessile, triangular, elongate or tear-drop shaped, 4.5–6 × 2.1–2.5 mm in bud, asymmetric; sepals 3, low, ca. 2.1–2.5 × 1.1–1.5 mm, united at the base; petals 3, triangular, elongate or spathulate, 4.2–5 × 2.1–3.5 mm, striate; stamens 6, small, 2.2–2.8 mm long and 1 mm wide; filaments thick, 0.9 mm long and 0.1–0.4 mm wide, darker than anther; anthers ca. 2.2 mm long and 0.6 mm wide, sagittate, longer than the filaments; pistillode longer than stamens, 2.5–3.2 × 0.8–1 mm, trifid. Pistillate flowers larger than the staminate, triangular, borne on the enlarged basal portion of rachillae, only one per rachillae, buds varying greatly in size depending on stage of development, 1.1 × 0.9 cm (in bud) to 2 × 1 cm (in late anthesis); sepals 3, strongly imbricate, ca. 1.5 × 0.9 mm in late anthesis, triangular, asymmetrical, striate; petals 3, imbricate, triangular, ca. 1.3 × 0.8 mm in late anthesis, striate; gynoecium 7–12 mm long and 3–5 mm; stigma ca. 3 mm long, pointed with 3 lobes, 0.3 mm long; style ca. 5–9 mm long; staminodal ring encircling gynoecium, 2 mm high, lacking differentiated staminodes. Fruit obovoid or ovoid with beak at the apex, 5.5−6 × 3.5−3.8 cm (unripe fruits), beak 4−6 mm long and 5–6 mm in diam.; epicarp smooth, shiny, dark green (unripe), mature fruits not seen; mesocarp fibrous, 0.5 cm thick, 1.5 cm thick at the base (below the seed); endocarp very thin, adhering closely to the seed. Seed obovoid, slightly flattened at base, ca. 3 × 2.2 cm (from unripe fruits); endosperm ruminate. Eophyl bifid. (Figures 1 & 2).

Distribution:—Known only from the type locality in PT Bima Cakrawala Nusantara (a coal mining company) concession area, close to Ayata village in East Maybrat District, Maybrat Regency in the central part of the Bird's Head Peninsula, West Papua Province, Indonesia.

Habitat:—This species grows in primary lowland peat forest at an elevation of about 200 m above sea level. It appears to be adapted to extreme conditions of the coal beds, which sometimes lack any apparent soil, except for leaf litter over the coal outcrop. Other palms observed growing in association with this new *Areca* include *Calyptrocalyx* sp., several species of *Hydriastele*, *Linospadix albertisianus* (Becc.) Burret (1935: 331), *Licuala beccariana* Furtado (1940: 37), *Licuala bifida* Heatubun & Barfod (2008: 431) and *Sommieria leucophylla* Beccari (1877: 67).

Local names:—*Srah Owei Knu* in (Aifat dialect, Mai Brat language). When the seedlings were planted in the nursery of the University campus in Manokwari, they were nicknamed *pinang unipa* (i.e. the betel nut of Universitas Papua).

Uses:—The fruits are chewed as a betel nut substitute. However, the palm has potential as an ornamental.

Conservation status:—Critically Endangered CR B2ab (ii,iii,v), C1, E (IUCN 2012). This palm meets the criteria for the extinction risk category Critically Endangered (IUCN 2012) because its area of occupancy is estimated to be less than 10 km^2 and it is known to exist only in one population in a single locality. Habitat loss from both coal mining and oil palm plantation were identified as the major threat not only for this new species but also to the other plants in the region. It is projected that the area of occupancy, the area, extent and quality of habitat and the number of mature individuals will decline due to the coal mining activities. In addition, population size is estimated to number less than 250 mature palms. Plants occur at low density, with only two mature individuals found within a 10 ha plot. We also believe that the population will decline due to traditional harvesting by local people for the fruits as betel nut substitute, which they collect by chopping down mature individuals. The combination of threats faced by this very rare species strongly support our assessment of Critically Endangered.

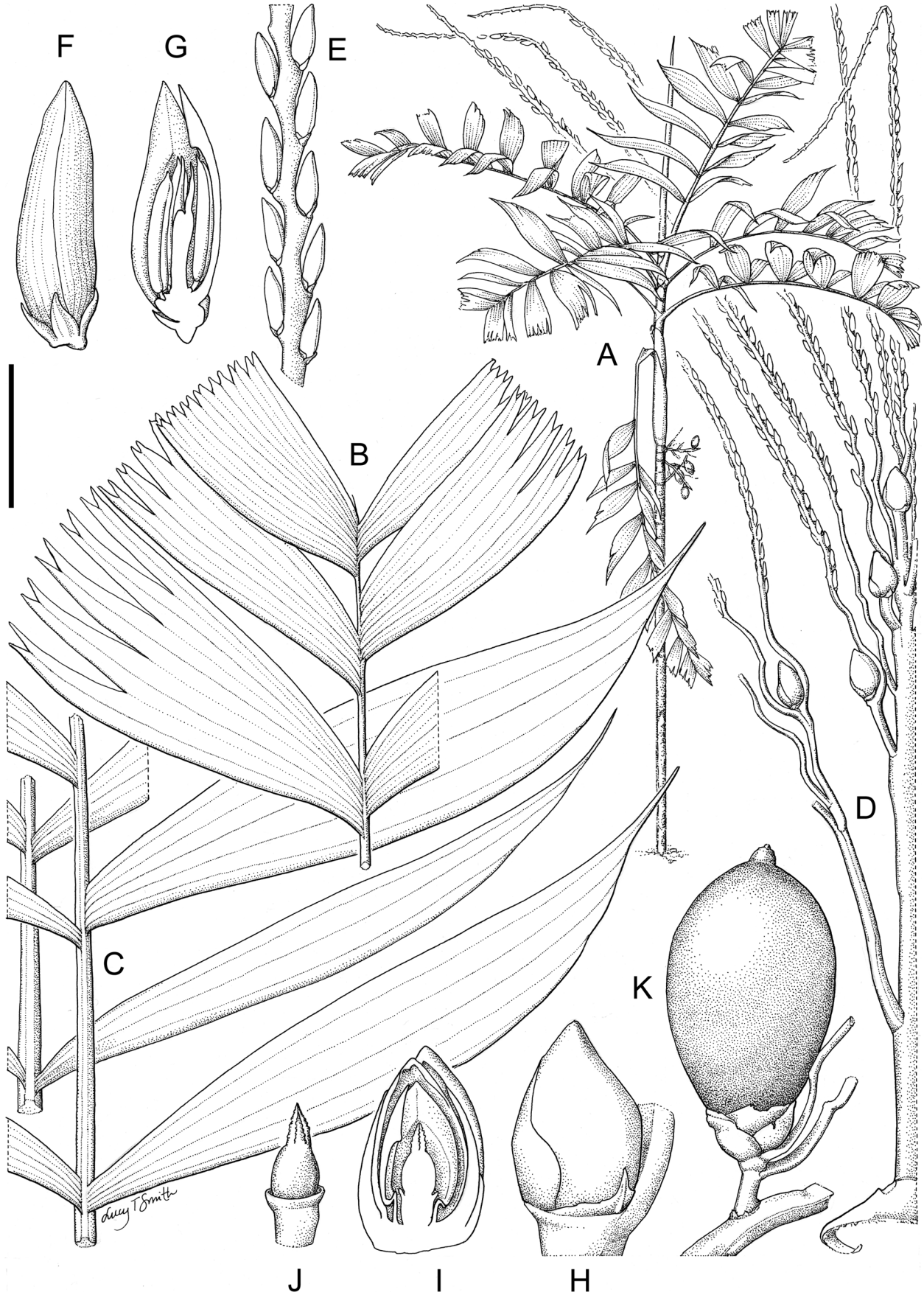

FIGURE 1. *Areca unipa*. A. Habit. B. Apical portion of leaf. C. Middle and basal portion of leaf. D. Half portion of inflorescence. E. Staminate flowers on rachilla. F, G. Staminate flower whole and in section. H, I. Pistillate flower whole and in section. J. Detail of ovary and staminodal ring. K. Fruit. Scale bar: A = 75 cm; B, C = 8 cm; D = 4 cm; E, J = 7 mm; F, G = 2.5 mm; H, I = 1 cm; K = 3 cm. All from *Iwanggin & Simbiak 138*. Drawn by Lucy T. Smith.

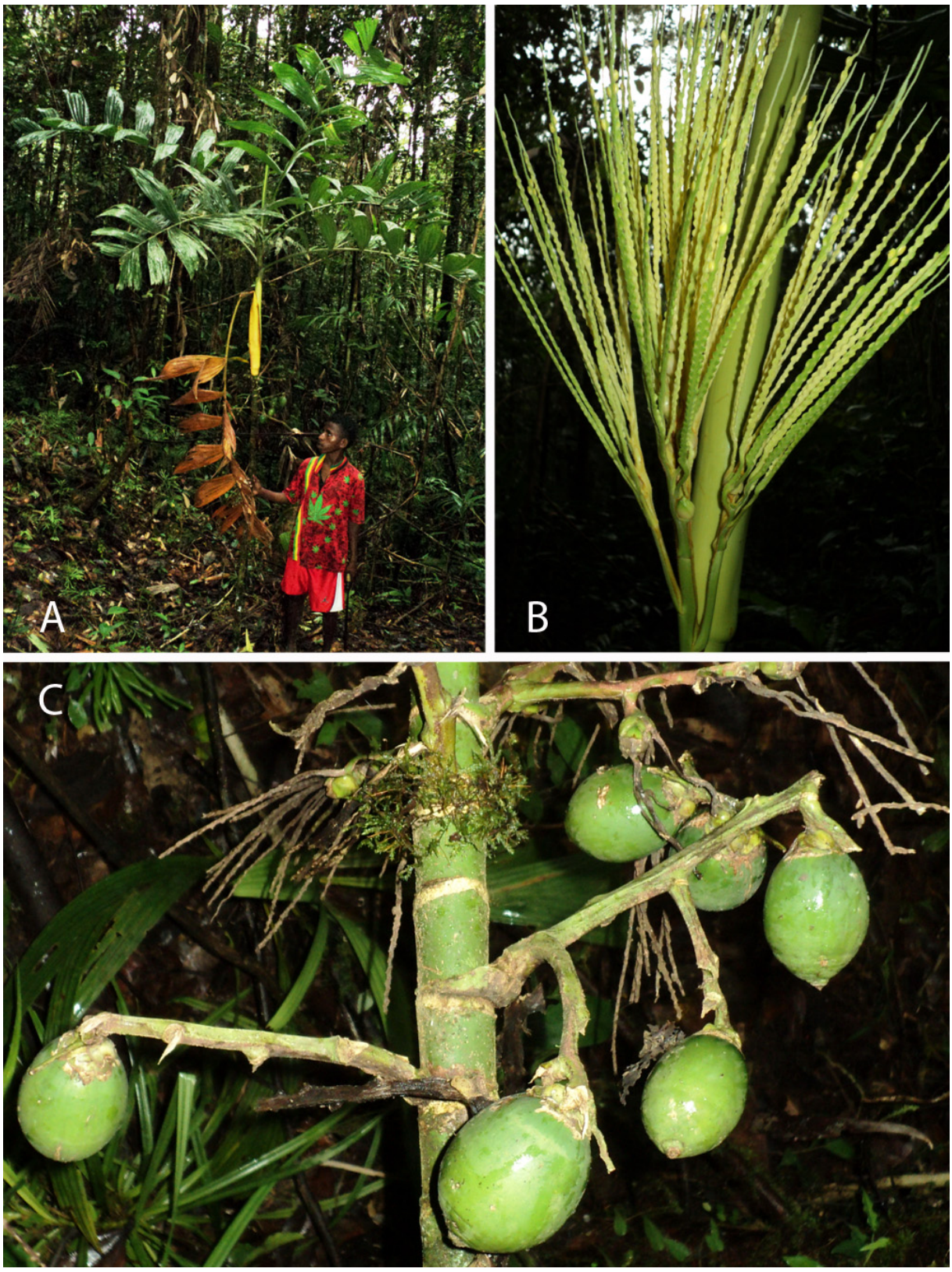

FIGURE 2. *Areca unipa*. A. Slender habit with long petioled leaves and the sigmoid multifold leaflets and broadly wedge-shaped terminal leaflets. B. Inflorescence starting to expand after the prophyll has fallen off. C. Infructescence with several young fruits. All photos were taken from the holotype specimen (*Iwanggin & Simbiak 138*) in the forest near Ayata Village, East Maybrat, Maybrat, West Papua, Indonesia. All photos by Marthinus P. Iwanggin.

Etymology:—The specific epithet refers to the acronym of Universitas Papua (the State University of Papua—UNIPA). This new species is named in celebration of the 10th anniversary of Universitas Papua and formalizes its nickname "*pinang unipa*".

Discussion:—Prior to the discovery of this new taxon, three species of *Areca* were known from New Guinea (Heatubun, 2008; Heatubun *et al.* 2012). The most widespread species, *A. macrocalyx* Zipp. ex Blume (1839: 75), is highly variable and some forms are superficially similar to *A. unipa* in vegetative morphology. However, *A. macrocalyx* has highly distinctive reproductive structures that are quite unlike *A. unipa*. Its inflorescence is protogynous, branched to one order (rarely two orders) and bears numerous (up to 600), closely spaced, slender, sinuous rachillae. Pistillate flowers occur only at the very base of the rachillae, the remaining portion bearing purely staminate flowers and drying and falling after anthesis. The maturing infructescence becomes congested with fruit, appearing spicate or club-like. None of these features correspond with *A. unipa*.

Areca unipa is most similar to *A. catechu* Linnaeus (1753: 1189) and *A. mandacanii* Heatubun (2008: 199) in its solitary, moderate tree palm habit and inflorescence structure, but it can immediately be distinguished by the small, slender leaves with relatively long petiole and very few multifold, sigmoid and broadly wedge-shaped leaflets. In contrast, *A. catechu* bears larger leaves with petiole short or almost lacking and single and/or multi-fold, linear leaflets, while *A. mandacanii* bears single-fold, linear leaflets that are arranged irregularly in groups and in several ranks. Besides that, this new species is smaller in almost all dimensions than *A. catechu* and *A. mandacanii*. For instance, *A. unipa* has seven leaves in the crown, a leaf about 102 cm long, 9–10 leaflets on each side of rachis, and inflorescence that is 30–40 cm long and branched to 2 orders. *Areca catechu* has 8–12 leaves in the crown, the leaf is 150–270 cm long with 20–35 leaflets on each side of rachis, and the inflorescence is 29–80 cm long and branched to 2–3 orders. *Areca mandacanii* has 8 leaves in the crown, the leaf is 200–250 cm long with about 60 leaflets each side of rachis, and the inflorescence is about 60 cm long and mostly branched to 2 (rarely 3) orders.

Though distinct, *A. unipa*, like *A. mandacanii*, is closely related to *A. catechu*, in its inflorescence architecture (divaricate panicle inflorescence with elongated branches and rachillae), the distichous floral clusters with only complete triad including female flower occuring at the base of each rachilla, the free sepals of staminate flowers (or sometimes fused at the base), six stamens and typical betel nut-like fruits. The discovery of yet another relative of *A. catechu* draws further attention to New Guinea as a potential area of origin for *A. catechu* as already highlighted by Heatubun *et al.* (2012). It is of great concern that this wild relative of an important crop species is so intensely threatened in its natural habitat.

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Literature Cited

Baker, W.J. (2002) Palms of New Guinea. *Flora Malesiana Bulletin* 13: 35–37.

Baker, W.J. & Heatubun, C.D. (2012) New palms from Biak and Supiori, Western New Guinea. *Palms* 56: 131–150.

Baker, W.J. & Loo, A.H.B. (2004) A synopsis of the palm genus *Hydriastele* (Arecaceae). *Kew Bulletin* 59: 61–68. http://dx.doi.org/10.2307/4111074

Baker, W.J., Zona, S., Heatubun, C.D., Lewis, C.E., Maturbongs, R.A. & Norup, M.V. (2006) *Dransfieldia* (Arecaceae) – a new palm genus from Western New Guinea. *Systematic Botany* 31: 61–69.

http://dx.doi.org/10.1600/036364406775971705
Banka, R. & Baker, W.J. (2004) A monograph of the genus *Rhopaloblaste* (Arecaceae). *Kew Bulletin* 59: 73–75. http://dx.doi.org/10.2307/4111073
Barfod, A.S. & Heatubun, C.D. (2009) Two new species of *Licuala* (Arecaceae; Coryphoideae) from North Moluccas and Western New Guinea. *Kew Bulletin* 64: 553–557. http://dx.doi.org/10.1007/s12225-009-9129-z
Beccari, O. (1877) Palmae Papuanae. *Malesia* 1: 21–23.
Blume, C.L. (1839) *Areca* Linn. *Rumphia 2*: 71–76.
Burret, M. (1935) Neue Palmen aus Neuguinea II. *Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem* 12: 309–348. http://dx.doi.org/10.2307/3994894
Dransfield, J., Hambali, G.G., Maturbongs, R.A. & Heatubun, C.D. (2000) *Caryota zebrina. Palms* 44: 170–174.
Furtado, C.X. (1940) Palmae Malesicae VIII – the genus *Licuala* in the Malay Peninsula. *Gardens Bulletin of Straits Settlements Singapore* 11: 31–73.
Heatubun, C.D. (2008) A new species of *Areca* from Western New Guinea. *Palms* 52: 198–202.
Heatubun, C.D. & Barfod, A.S. (2008) Two new species of *Licuala* (Arecaceae; Coryphoideae) from Western New Guinea. *Blumea* 53: 429–434. http://dx.doi.org/10.3767/000651908x608061
Heatubun, C.D., Baker, W.J., Harley, M.M., Mogea, J.P., Tjitroesoedirdjo, S.S. & Dransfield, J. (2009) A monograph of *Cyrtostachys* (Arecaceae). *Kew Bulletin* 64: 67–94. http://dx.doi.org/10.1007/s12225-009-9096-4
Heatubun, C.D., Dransfield, J., Flynn, T., Tjitroesoedirdjo, S.S., Mogea, J.P. & Baker, W.J. (2012). A monograph of the betel nut palms (*Areca*: Arecaceae) of East Malesia. *Botanical Journal of the Linnean Society* 168: 147–173. http://dx.doi.org/10.1111/j.1095-8339.2011.01199.x
IUCN. (2012) *IUCN red list categories and criteria: Version 3.1*. Second edition. IUCN, Gland & Cambridge, 418 pp. http://dx.doi.org/10.5962/bhl.title.45189
Linnaeus, C. (1753) *Species Plantarum*, *Volume* 2. Laurentius Salvius, Stockholm, pp. 561–1200.