

glabrous; rachilla 18–20 cm long, to 3 mm diam., fusiform. *Flowers* bright yellow. *Staminate flower* pointed in bud, widely opening at maturity; sepals c. 1 mm long, scarcely carinate, moderately striate; petals to 5 mm long, broadly ovate, triangular, pointed, rigid, longitudinally striately-nerved; stamens 8 or 9, c. 6 mm long, unequal in length; anthers 1–1.5 mm long, versatile, yellow; pistillode elongate. *Pistillate flower* c. 3 mm high, obtusely pyramidal; sepals c. 1.5 mm long, obtuse, with ciliate margins, gibbose-carinate; petals c. 3 mm long, striately-nerved; stigma papillose. *Fruit* globose to subglobose, 11–12 mm long, 7–8 mm diam., black; epicarp smooth, crustaceous when dry; mesocarp mealy, fibrous, bright yellow, with fibres tightly fused, reticulate to anastomose; endocarp adherent to the seed. *Seed* globose to ovoid, c. 8 mm long, c. 6 mm diam.; raphe longitudinal; endosperm ruminant.

*Distribution* — Indonesia: Papua: Sorong, Manokwari, and Fakfak Divisions.

*Habitat & Ecology* — In rain forest at 250–2000 m.

*Etymology* — The species was named for the type locality, Arfak Mts.

*Vernacular name* — Mbep (Anggi language – Arfak Mts).

*Note* — *Calyptrocalyx arfakianus* is distinguished by the combination of a solitary habit, small stature, multi-spiked inflorescence, globose to subglobose black fruit, and ruminant endosperm. The original description of *Paralinospadix pachystachys* from Waigeo Island matches *C. arfakianus* very closely, and despite the loss of the type specimen, *Stein 128* (B†), the name is placed as a synonym of *C. arfakianus*.

#### 4. *Calyptrocalyx awa* Dowe & M.D. Ferrero, *spec. nov.* — Fig. 2

Palma caespitosa, statura parva, foliis segmentis foliorum irregulariter dispositis, vaginis foliorum marginibus laevibus, inflorescentia bi-spicata, spicis filiformibus flexuosis, petalis apicaliter rubro-vittatis, filamentis elongatis, staminibus 6–7, pistillodio columnari, fructu globoso, mesocarpio fibroso, fibris aggregatis prope endocarpium, endospermio homogeneo. — *Typus*: Dowe & Ferrero 507 (holo BRI; iso K, LAE), Papua New Guinea, W Sepik Province, Vanimo District, Pual River area, Wasimei, 10 Feb. 1998.

Clustering, small palms. *Stems* 2–5, 2–3 m tall, 20–30 mm diam.; internodes to 5 cm long, green; crown with 8–11 leaves. *Leaves* bifid, or irregularly segmented or regularly pinnate, 90–129 by 30–58 cm, new leaf emerges peach-bronze; leafbase 16–30 cm long, margin ± smooth; petiole 5–18 cm long, shallowly channelled adaxially; rachis 50–69 cm long, ridged adaxially, rounded abaxially; segments 2–6, with 1–8 ribs per side, irregularly arranged; ribs adaxially prominent; lamina semi-glossy green adaxially, lighter dull green abaxially; ribs and veins not raised abaxially. *Inflorescence* 40–70 cm long, 2-spiked; prophyll 17 cm long; peduncular bract to 26 cm long; peduncle 10–20 cm by 3–4 mm; rachilla 30–50 cm long, 3.5–4.5 mm diam. *Flowers* cream to green. *Staminate flower* c. 2 mm high; sepals c. 0.5 mm long; petals c. 2 mm long, triangular, rigid, red-tinged, densest toward the apex; stamens 6 or 7, c. 1 mm long; filaments c. 1 mm long; anthers linear, 0.5 mm long, shallowly sagittate, versatile; pollen mostly circular in polar view, long axis 21.7–25.3  $\mu\text{m}$ , short axis 16.3–21.7  $\mu\text{m}$ , monosulcate, exine finely reticulate; pistillode columnar, c. 1.5 mm long. *Pistillate flower* not seen. *Fruit* globose, 10–12 mm diam., orange; epicarp smooth, thin; mesocarp moderately fibrous; fibres thick, aggregated toward the endocarp. *Seed* globose, 7–10 mm diam.; endosperm homogeneous.

*Distribution* — Papua New Guinea: W Sepik Province, Vanimo District.

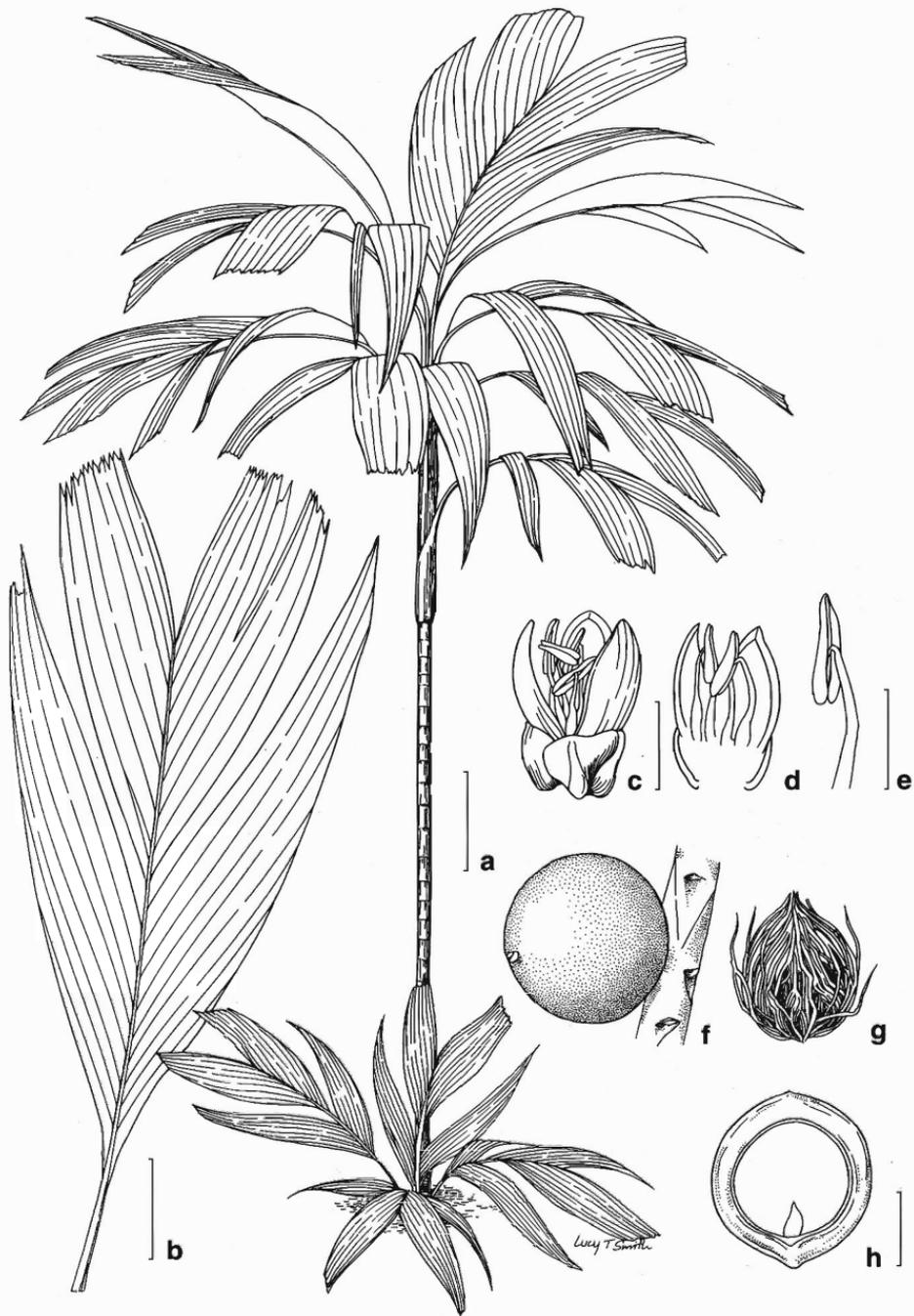


Fig. 2. *Calyptrocalyx awa* Dowe & M.D. Ferrero. a. Habit, with dominant stem and basal sucker; b. leaf; c. staminate flower; d. staminate flower in longitudinal section; e. stamen; f. fruit attached to rachilla; g. fruit with epicarp removed to reveal mesocarp fibres; h. fruit in longitudinal section. —Scale bars: a = 20 cm; b = 10 cm; c & d = 1 mm; e = 0.5 mm; f–h = 5 mm (Dowe & Ferrero 507). Drawing by Lucy T. Smith.

Habitat & Ecology — In rain forest at 10–60 m.

Etymology — The species name is taken from the vernacular name, *awa*, used by the Osima people from Pual River and Oiru areas, inland from Vanimo. The name *awa* is also used for *C. pachystachys*, an unrelated species.

Notes — 1. *Calyptrocalyx awa* is distinguished by a clustering habit, staminate flowers with small, rigid, red-tinged petals, 2-spiked inflorescence, globose orange fruit and homogeneous endosperm. Fruit is widely spaced on the rachilla.

2. Seedling leaves have a metallic lustre that gradually fades as plants assume a size to about 30 cm tall. New leaves emerge peach-bronze in juvenile and adult plants.

3. Stems are occasionally used to make practise bows by children.

### 5. *Calyptrocalyx caudiculatus* (Becc.) Dowe & M.D. Ferrero, *comb. nov.*

*Linospadix caudiculata* Becc., Nova Guinea 8 (1909) 213. — *Paralinospadix caudiculatus* (Becc.)

Burret, Notizbl. Bot. Gart. Berlin-Dahlem 12 (1935) 335, syn. nov. — Type: *Koch s.n.* (holo L; iso FI), Indonesia, Papua, Etna Bay, 1904–1905.

Clustering, small palms. *Stems* 2–10, erect, to 3 m tall, 10–20 mm diam.; internodes to 4 cm long, dark green; crown with 9–11 leaves. *Leaves* regularly pinnate, 55–70 cm long, to 30 cm wide, new leaf emerges red; leafbase to 17 cm long, 2 cm wide, with fine longitudinal striations, scattered brown scales, ligule marcescent; petiole 13–35 cm by 7 mm, adaxially channelled, with scattered brown scales; rachis with scattered brown scales; pinnae 8 or 9 per side, alternate, placed c. 12 cm apart, sigmoid to lanceolate, irregularly blotched, narrowing toward the base, apically caudate to a filamentous drip tip 7–8 cm by 1 mm; midleaf pinnae 27–28 by 4.5–5 cm, chartaceous, dark green adaxially, lighter green abaxially; midrib prominent. *Inflorescence* 90–120 cm long, 2–8-spiked; peduncle 50–70 cm long, 2 mm diam., terete, with fine longitudinal striations, sparse reddish scales; rachilla 40–50 cm long, 4 mm diam.; floral pits shallow. *Flowers* cream. *Staminate flower* c. 2 mm long; petals c. 2 mm long, triangular, cupped; stamens 6–8, unequal in length, c. 4 mm long; anthers linear-sagittate, versatile, cream; pistillode c. 2 mm long, filiform. *Pistillate flower* c. 2 mm long, subglobose to conic, pointed. *Fruit* broadly ellipsoid to subglobose, 10–12 mm long, 5–6 mm diam., purple-black; epicarp smooth, coarsely granular when dry. *Seed* ovoid, 8–10 mm long, 6–8 mm diam.; endosperm homogeneous.

Distribution — Indonesia: Papua: Fakfak Division.

Habitat & Ecology — In rain forest.

Etymology — The specific epithet is from *caudiculus* – a small tail, referring to the extended ‘drip-tip’ of the pinnae.

Notes — 1. *Calyptrocalyx caudiculatus* is distinguished by a clustering habit, sigmoid, caudate pinnae, multi-spiked inflorescence, broadly ellipsoid to subglobose purple-black fruit and homogeneous endosperm.

2. Seedling leaves are strongly blotched.

### 6. *Calyptrocalyx doxanthus* Dowe & M.D. Ferrero — Fig. 3

*Calyptrocalyx doxanthus* Dowe & M.D. Ferrero, Wodyetia 4 (1999) 9. — Type: *Dowe 530* (holo BO; iso BRI, K), ex cult., Indonesia, Java, Bogor, Baranangsiang Indah, Salacca Breeding Laboratory Garden, 12 Dec. 1998, cultivated from material collected by G. Hambali from Jayapura Division, Cyclops Mts, Ifar, 250–800 m alt., Dec. 1992.