

### 10. *Calyptrocalyx geonomiformis* (Becc.) Dowe & M.D. Ferrero, *comb. nov.*

*Linospadix geonomaeformis* Becc., Nova Guinea 8 (1909) 211, t. 51, 1. — *Paralinospadix geonomiformis* (Becc.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 12 (1935) 335, syn. nov. — Type: *Versteeg 1627* (holo FI), Indonesia, Papua, Paniai Division, Mt Resi, 250 m, 1907.

Solitary or clustering, small palms. *Stems* to 1 m tall, 12–14 mm diam.; internodes 2–2.5 cm long. *Leaves* bifid or irregularly segmented, 45–55 by 28–30 cm; leafbase to 27 cm long, slightly swollen, with scattered orange-brown appressed scales, margins lacerate-fibrous; petiole 4–11 cm long, shallowly channelled adaxially; rachis rounded on both sides, with scattered orange-brown appressed scales; lamina when bifid, cuneate, broadly attached to the rachis, 16–18 ribs per side raised on adaxial surface, with brown scales abaxially; when segmented with 2 or 3 segments per side, basal and apical segments broad, 31–40 by 5–8 cm, falcate-acuminate, terminally acute, apex dentate, segments and ribs strongly curved toward the leaf apex, mid-leaf segments much narrower, 31–35 cm by 10–12 mm with a single rib; lamina chartaceous, rigid, dark green adaxially, lighter green abaxially. *Inflorescence* 40–60 cm long, 1- or 2-spiked; prophyll 8 cm long; peduncular bract 21–26 cm long, membranous, disintegrating into marcescent fibres; peduncle 36–48 cm long, 2–3 mm diam., dorsiventrally compressed with acute margins, surface with reddish scaly tomentum; rachilla 18–20 cm long, broadly-fusiform, 5–6 mm wide in the middle; floral pits congested, deep, with reddish scaly tomentum. *Staminate flower* ovoid in bud, 4–5 mm long, slightly asymmetrical; stamens 6, equal, erect; filaments linear; anthers narrowly sagittate, apex obtuse or obscurely bidentate, versatile; pistillode elongate, about as long as the stamens, trigonal, apex trifid. *Pistillate flower* ovoid, c. 3.5 mm long, sepals c. 1.5 mm long, rounded; petals c. 3 mm long, apex briefly apiculate; stigma broadly triangular; staminodes 6, equal. *Fruit* not seen.

*Distribution* — Indonesia: Papua: Paniai Division. Mt Resi and Mt Carstensz.

*Habitat & Ecology* — In rain forest at 250–1000 m.

*Etymology* — The specific epithet is from *geonoma*, and possibly relates to the resemblance of the leaf to some species in the genus *Geonoma* Willd.

*Note* — *Calyptrocalyx geonomiformis* has a distinct leaf morphology with the ribs in all segments strongly curved toward the leaf apex. This feature is known to occur in only one other species, *C. julianettii*, from Central Province, Papua New Guinea, although differences in inflorescence structure indicate that these are two readily differentiated species. The inflorescence of *C. geonomiformis* is 1- or 2-spiked, with the rachilla considerably thicker than the peduncle, and that in *C. julianettii* is consistently 4-spiked with the rachilla scarcely thicker than the peduncle. In addition, the petiole of *C. geonomiformis* is moderate to elongate, while it is absent to very short in *C. julianettii*.

### 11. *Calyptrocalyx hollrungii* (Becc.) Dowe & M.D. Ferrero, *comb. nov.*

*Linospadix hollrungii* Becc. in K. Schum. & Hollrung, Fl. Kais. Wilhelmsl. (1889) 16. — *Paralinospadix hollrungii* (Becc.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 12 (1935) 334, syn. nov. — Type: *Hollrung 226* (holo B†; iso and illustrations FI), Papua New Guinea, Morobe Province, Sattelberg, 1886.

*Linospadix hellwigiana* Warb. in K. Schum. & Lauterb. (nomen tantum, 'in Mons. ined.'). Fl. Deutsch. Schutzgeb. Südsee (1900) 206 [as *Linospadix helwigianus* Warb. (nomen) in Becc.,

*Webbia* 1 (1905) 293]. — Type: *Lauterbach 602* (holo B†; iso FI), Papua New Guinea, Morobe Province, Sattelberg, summit forest, 970 m, 24 July 1890.

*Linospadix schlechterii* Becc., *Webbia* 1 (1905) 296. — *Paralinospadix schlechterii* (Becc.) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 12 (1935) 335, syn. nov. — Type: *Schlechter 13955* (holo B†; photos and illustrations FI), Papua New Guinea, Madang Province, Bismarck Mts, 1000 m, Jan. 1902.

*Paralinospadix clemensiae* Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 13 (1936) 322, syn. nov. — Type: *Clemens 1828* (holo B†), Papua New Guinea, Morobe Province, Wareo, hill forest, 800 m, 1 Feb. 1936.

Solitary or clustering, small palms. *Stems* 1–20, erect or leaning, to 3 m tall, 12–20 mm diam.; internodes 1.5–8 cm long, pale brown; crown with 6–11 leaves. *Leaves* bifid or irregularly segmented or regularly pinnate, 45–180 by 16–29 cm, new leaf emerges dark red, crimson or purple; leafbase 11–22 cm long, green, margins moderately lacerate-fibrous; petiole 4–30 cm by 4–7 mm, adaxially flat or deeply channelled, with dark scaly tomentum, abaxially rounded; lamina dark green adaxially, lighter green abaxially, rigid, coriaceous. Leaves, when bifid, are deeply lobed, cuneate-attenuate at the base, with apex minutely dentate, 12 or 13 ribs raised on adaxial surface, secondary veins much thinner than the ribs; in irregularly segmented leaves, segments 3–14, variously arranged with some segments narrow linear to acuminate, 1- or 2-ribbed, others broader with 5–7 ribs and the apex attenuate to caudate, spacing between segments broad to narrow, secondary veins abaxially scaly; in regularly segmented leaves, pinnae 13–16 per side, flatly falcate, basally narrowing, midrib prominent, apical pinnae basally joined and with 3 veins; apical pinnae to 13 cm long, to 1 cm wide, mid-leaf pinnae to 22 cm long, to 6 mm wide. *Inflorescence* 68–120 cm long, 1–3-spiked, spikes often curling; prophyll 18–24 cm long, narrowly cylindrical, 5 mm diam., brown, with dark scaly tomentum; peduncular bract 30–48 cm by c. 8 mm, light brown; peduncle 40–59 cm by 2–3 mm, subterete, with dark scaly tomentum; 1 or 2 rameal bracts c. half-way along peduncle, narrow linear, 1–4 mm long; rachilla 20–30 cm long, 3–4 mm diam., slightly thicker than the peduncle, with scaly tomentum. *Flowers* cream to straw coloured, closely or distantly placed; floral pits glabrous, margin truncate. *Staminate flower* to 4 mm high, linear to lanceolate, in bud appressed in pairs resembling rodent incisor teeth; sepals 1–1.5 mm high, roundly ovate, carinate, apex obtuse, margin ciliate; petals 3–4 mm long, linear, striate on the outer surface; stamens 6–12; anthers linear, 3 mm long, deeply sagittate, versatile; pollen circular to elliptical in polar view, long axis 21.7–32.6  $\mu\text{m}$ , short axis 14.5–23.5  $\mu\text{m}$ , monosulcate, exine finely reticulate; pistillode small with a pointed trifold apex. *Pistillate flower* globose, 2–2.5 mm high; sepals c. 1 mm long; petals c. 2 mm long; staminodes narrow; stigma obtuse, 0.6 mm long. *Fruit* ovoid to ellipsoid, 12–16 mm long, 6–9 mm diam., orange to red; epicarp smooth, granular-scabrous when dry; mesocarp fibrous, fibres scattered throughout. *Seed* globose to pyriform, 9–10 mm long, 6–7 mm diam.; endosperm homogeneous.

*Distribution* — Papua New Guinea: Madang, Morobe, and Northern Provinces.

*Habitat & Ecology* — In rain forest at 90–1000 m.

*Etymology* — The species was named for Max Udo Hollrung (1858–1937), collector of the type specimen.

*Vernacular name* — Hulameng (Khotte language – Sattelburg).

Notes — 1. *Calyptrocalyx hollrungii* is distinguished by a clustering or solitary habit, leaves bifid or irregularly segmented or regularly pinnate, paired staminate flowers that are appressed in bud and resemble a pair of rodent teeth, straw-coloured elongate petals; straight or often curling filamentous inflorescence spikes, and orange to red ovoid to ellipsoid fruit with homogeneous endosperm.

2. *Linospadix hellwigiana* is attributable to this species, and represents an irregularly segmented leaf form. Similarly *Paralinospadix clemensiae*, collected from Wareo, an area close to Sattelburg, and *P. schlechterii*, collected from Bismarck Mts, Madang Province, are both attributable to *C. hollrungii*. The former collection displays a regularly pinnate leaf, while the latter has a bifid leaf.

## 12. *Calyptrocalyx julianettii* (Becc.) Dowe & M.D. Ferrero, *comb. nov.*

*Linospadix julianetti* Becc., Webbia 1 (1905) 295. — *Paralinospadix julianettii* (Becc.) Burret, Notizbl. Bot. Gart. Berlin-Dahlem 12 (1935) 334, *syn. nov.* — Type: *Loria & Giulianetti s.n.* (holo FI), Papua New Guinea, Central Province, Mekeo Dist., upper St Joseph River, 'Camp 14', Nov. 1892.

*Paralinospadix amischus* Burret, Notizbl. Bot. Gart. Berlin-Dahlem 12 (1935) 335, *syn. nov.* — Type: *Brass 3826* (holo BRI; iso A n.v., NY n.v.), Papua New Guinea, Central Province, Ononge Road, Dieni, 500 m, 21 Apr. 1933.

Solitary or clustering, small palms. *Stems* erect, 1–2 m tall, 12–24 mm diam.; crown with c. 10 leaves. *Leaves* irregularly segmented, 60–90 by 25–30 cm, with outer margin curved toward the leaf apex; leafbase 14–18 cm long, cylindrical, with scaly tomentum, margin finely lacerate-fibrous; petiole absent, or 1–3 cm by 3–4 mm, shallowly channelled adaxially; lamina 36–70 cm long, outline elongate to elliptical, 5–12 segments per side, segments falcate to sigmoid, rigid, dark green adaxially, lighter abaxially; narrow segments with a single midrib, broad segments with 2–12 ribs, lowest segments shortest, with 1–3 ribs, apical segments broad with 7–9 ribs, midleaf segments narrower than either basal or apical segments, 10–15 mm wide; midribs raised only on adaxial surface. *Inflorescence* 40–90 cm long, 1–4-spiked; prophyll 16–17 cm long; peduncular bract 24–38 cm long, with dark scaly tomentum; peduncle 20–40 cm long, subterete, 1.5–3 mm wide; rameal bracts in distal portion to 2 mm long; rachilla 15–30 cm long, 3–3.5 mm diam., fusiform, with dark scaly tomentum; floral pits distantly to closely spaced, margin raised. *Staminate flowers* 2.5–5 mm long in bud, ovoid; sepals c. 1 mm long, broadly ovate, basally ridged, margins ciliate; petals 2–5 mm long, longitudinally striate, cream; stamens 9; anthers linear, shallowly sagittate, versatile; pistillode narrow, columnar. *Pistillate flowers* with sepals broadly rounded; petal apex briefly triangular. *Fruit* ellipsoid, tapered acutely to the apex, 11–13 mm long, 6–9 mm diam., red; epicarp smooth, minutely linear granular when dry; mesocarp fleshy. *Seed* globose, 5–8 mm diam.; endosperm homogeneous.

*Distribution* — Indonesia: Papua: Fakfak Division. Papua New Guinea: Morobe, Northern, and Central Provinces.

*Habitat & Ecology* — In rain forest at 100–1200 m.

*Etymology* — It was named for the collector of the type specimen, Amedeo Giulianetti, expedition assistant to Dr Lamberto Loria.