

brown; bases of partial inflorescences with dense chocolate brown tomentum; rachillae 8–12 cm long, subterete to angular, 2–3 mm thick, basally with chocolate brown tomentum. Flowers solitary or in clusters of 2–4, tightly aggregated in bud and during anthesis, ca. 1.2 mm high; sepals fused, lobes long, triangular, ca. 1 mm long, apically acute, longitudinally nerved; petals triangular, obtuse, apically acute, occasionally shark-tooth like, ca. 1 mm long, ca. 1.2 mm wide at the base, adaxial surface with the impressions of the stamens; connective very thin, ca. 0.5 mm long; anthers ovoid, ca. 0.1 mm long; carpels ca. 0.8 mm high, stigmas pointed. Fruit globose, ca. 25 mm diam., orange-red, shiny; epicarp with scattered dot-like lenticels and light 3 mm long lines pointing in longitudinal direction toward the apex; stigmatic remains apical to slightly sub-apical; mesocarp fleshy, fibers thick, distributed throughout but more densely aggregated toward the endocarp and shallowly embedded in the surface of the endocarp; endocarp to 1 mm thick, bony; pedicel 4–5 mm long, 2 mm thick, jointed, green, with prominent scars of fallen flowers. Seed globose; endosperm intruded by the seedcoat to about two-thirds across, intrusion broadly kidney-shaped; embryo lateral. Eophyll 5-ribbed. *Manganau* (Lababia language). (Figs. 1–5).

SPECIMENS EXAMINED: PAPUA NEW GUINEA, Gulf Province, Vailala River, hills inland, Dec. 1922, *Lane-Poole 332* (BRI). Morobe Province, Lababia, Bulili Ridge, 400 m alt., 6 Apr. 2000, *Kjaer 514 with Magun* (AAU, LAE). Central Province, Kuriva Mission, 22 Mar. 1998, *Ferrero 980080, 980081, 980083* (LAE).

DISTRIBUTION, HABITAT AND ECOLOGY. Papua New Guinea, in Central Province, Kuriva area, in Gulf Province on hills near the Vailala River, and in Morobe Province near Lababia on Bulili Ridge. Grows in isolated colonies, sometimes locally common, on slopes with calcareous or clayey soils, at 300–400 m alt. Flowering January to February; fruiting March to May.

ETYMOLOGY. In reference to the brown color of the tomentum at the base of the partial inflorescences and rachillae.

Livistona chocolatina was first collected by Lane-Poole in 1922 as '*Livistona sp. No. 332*' (Lane-Poole 1925) from "hills inland from Vailala River." It was not collected again until 1998, by M. Ferrero, and then again in 2000 by Barfod et al., and from whose collections the type *Barfod 466* (AAU) was chosen. The species is distinguished by the usually spineless or only mildly spiny petiole that initially has a thick coating of white waxy powder, smallish rigid leaves, a trifurcate inflorescence with each

axis having multiple peduncular bracts, distinctive chocolate brown tomentum on the basal surfaces of the partial inflorescences and rachillae, and globose fruit to 25 mm diameter that mature orange-red.

***Livistona brevifolia* Dowe & J.P.Moge sp. nov.**

Palma ad 22 m alta, foliis parvis, laminis semicircularibus, 62 × 55 cm, valde costapalmatis, supra smaragdinis, infra prasinis, segmentis rigidis vadoso-fissis, hastula non bene evoluta; inflorescentia trifurcata ramis rachillisque gracilibus, bracteis peduncularibus carenti; floribus in glomerulis 2–4; fructu globoso 10–12 mm diametro endospermio postamento irregulariter intruso. Typus: Indonesia, Papua, Kepulauan Raja Ampat, West Waigeo, Kawe Island, 0°02'41"S, 130°08'28"E, 17 Nov. 2002, *J.P.Moge 8171 with W. Takeuchi, D. Neville & F. Liuw* (Holotypus: BO; isotypi: K, L, MAN, NY).

Solitary, hermaphroditic (?) palm. Trunk to 22 m tall, ca. 12 cm dbh, erect, slightly broader at the base, narrowing to ca. 10 cm at the apex, light grey, nodes slightly raised, internodes narrow, petiole stubs not retained. Leaves 16–40 in a spherical crown; petiole ca. 110 cm long, slightly arching, green, proximally 29–42 mm wide, distally 12–13 mm wide, triangular in cross section, adaxially slightly concave, abaxially rounded, glabrous, with deciduous white waxy scales on the adaxial surface, margins spineless; leaf-base fibers course, woven in one layer, brown, persistent until leaf fall then deciduous; ligule 12–25 cm long; hastula poorly developed, strongly asymmetric; lamina semi-circular, strongly costapalmate, moderately folded, rigid, 55–62 cm long and 45–55 cm wide, adaxially mid green, abaxially light green; segments 22–25, rigid, free for 17–53% of their length, apical split 1–4% of length of free segment, apices rigid; mid-lamina segments 2–2.5 cm wide at the disjunction; parallel veins 5–7 each side of midrib; transverse veins more prominent, extend across 1–4 parallel veins, density ca. 60 per unit area of 15 × 10 mm. Inflorescences basally trifurcate with ± identical axes, 60 cm long, but with central axis slightly longer and moderately more robust than the lateral axes; each axis with 2–3 partial inflorescences, branched to 3 orders; prophyll 35–45 cm long, 2.5–3.5 cm wide, papyraceous, entire at the apex, glabrous; peduncle of central axis subterete to laterally compressed, 18–20 mm diam.; peduncles of lateral axes terete, 8–12 mm diam.; each axis lacking peduncular bracts; rachis bracts 15–25 cm long, tightly tubular, papyraceous, not disintegrating at the apex with maturity; bases of partial inflorescences with green tomentum;

rachillae 4–9 cm long, rigid, subterete to angular, ca. 0.5 mm thick. Flowers not seen, but in clusters of 2–4 based on the number of persistent bracteoles on the pedicel. Fruit globose, 10–12 mm diam.; only immature but full-size fruit seen; epicarp thin, smooth, drying minutely tuberculate

with scattered lenticels, not waxy; stigmatic remains apical; mesocarp thin, non-fibrous; endocarp thin, crustaceous; pedicel 2–3 mm long, ca. 1 mm thick. Seed globose, 8–10 mm diam.; endosperm intruded by the seedcoat to about 3/4 across, intrusion of soft tissue irregularly shaped

with minor intrusions extending to the outer edge of the endosperm; embryo subapical, ca. 1 mm long. Eophyll not seen. (Fig. 6).

SPECIMENS EXAMINED: INDONESIA. Papua, Kep. Rajah Ampat, West Waigeo, Kawe Island, 0°02'41"S, 130°08'28"E, 17 Nov. 2002, *Mogea* 8224 with *W. Takeuchi*, *D. Neville* & *F. Liuw* (BO, K).

DISTRIBUTION AND HABITAT. Indonesia, in western Papua at Raja Ampat, at low altitude. Grows in open coastal forest on ultrabasic rocks at 10–20 m altitude, associated with a *Syzygium* sp. and *Pandanus* sp.

ETYMOLOGY. From Latin, *brevi*, short, and *folius*, leaf, in reference to the small leaves.

Livistona brevifolia was first collected by JPM during an ecological survey of the Raja Ampat Islands, Papua, Indonesia, conducted in November 2002. The small leaves relative to the palm's height immediately distinguish the species. Although other species of *Livistona* may have similarly small leaves, such as *L. humilis* R.Br. and *L. exigua* J.Dransf., those species do not reach the height that *L. brevifolia* does, and indeed are confined to the under-story or lower strata of the forest, whereas *L. brevifolia* emerges above the canopy. Morphologically it is closest to *L. woodfordii* Ridley from Milne Bay Province, PNG and the Solomon Islands. *Livistona brevifolia* is distinguished from *L. woodfordii* by much smaller leaves, smaller fruits and a seed coat intrusion into the endosperm that is irregular rather than regular. *Livistona brevifolia* also lacks the additional rachis bracts that are a feature of *L. woodfordii*. Otherwise, *L. brevifolia* falls within the '*Livistona rotundifolia*' group, distinguished by the trifurcately branched inflorescence and shallow clefts of the leaf segment apices.

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