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Four New *Pinanga* Blume (Palmae) Species from Peninsular Malaysia

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Abstract

Four new *Pinanga* species, all from Johor, are described: *P. jamariensis, P. johorensis, P. palustris* and *P. pantiensis*.

Introduction

Since 1989, the Palm Search Malaysia project has made innumerable and repeated trips around Peninsular Malaysia, gaining important field experiences and findings of new or forgotten species. Stimulated by fresh data, the genera *Iguanura* Blume and *Pinanga* Blume have been given priority for updating and revision – a process of "unravelling", especially because of historical uncertainties, inherent in the monumental and strenuous efforts of earlier collectors including H.N. Ridley and others, in the determination of some herbarium specimens. The *Iguanura* revision has since been published (Lim, 1996).

To facilitate the ongoing revision of *Pinanga* within Peninsular Malaysia, I decided to sort out certain vexatious aspects relating to *P. patula sensu* Scheffer, Beccari and Ridley *non* Blume (Lim, 1998), and now, for taxonomic convenience, to publish four new species, which have been in draft since 1994 or earlier. The taxa are all coincidentally from Johor: *P. jamariensis* C.K. Lim, *P. johorensis* C.K. Lim & L.G. Saw, *P. palustris* Kiew, and *P. pantiensis* J. Dransfield.

Saw Leng Guan had shared the discovery of *P. johorensis*, for which he is co-author. We gladly decided to honour the State of Johor by the epithet, as indeed it is quite widespread there (several previous collectors

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having considered it to be *P. malaiana* (Mart.) Scheff., e.g. *Whitmore FRI 0187*, SING). *P. jamariensis* and *P. pantiensis* are more localised in their known habitat, the latter being probably more seriously endangered by forest clearance at Linggiu and Gunung Panti, where an *in situ* conservation effort would be most desirable and urgent. *P. palustris*, although earlier thought to be localised to the Endau area, is now known to be quite widespread not only in Johor but also along the east coast of the Peninsula up to Terengganu. As with *P. johorensis*, with which it often shares its habitat, many early collections of this taxon have been labelled as *P. malaiana*, e.g. *Tan Ah King 23* from Mawai, 1959, SING (but note: *Tan Ah King 23A*, SING, collected contiguously is *P. johorensis*). It is also one of the few Malayan *Pinanga* species that appears to have an affinity with Sarawak ones, in particular, *P. mirabilis* Becc. (1886).

*Note: Within this account, as in my other taxonomic papers, certain specimens (prefix: *H) currently kept in the Palm Search Malaysia collection are cited to supplement herbarium collections examined. Although it is intended eventually to deposit more specimens in the major reference herbaria, many items represent field records of the in situ conservation status, which the PSM project is in the process of monitoring.*

1. *Pinanga jamariensis* C.K.Lim **sp. nov**

P. auriculatae var. merguensi similis sed foliis parvidissectis et glaucis bene distincta.

Typus: Johor: Bukit Jamari, 1993, *C.K.Lim H1456* (holotypus SING, isotypus KEP).
Plates 1–4.

Solitary, stilt-rooted; stem grey-brown, erect, 3–8.5m tall, slender, 2 cm diam., internodes 5–12 cm. Crown with eight or more leaves; leaf sheath c. 28 cm, distinctly glaucous, white, tinged pink within; petiole 5 mm diam. to 30 cm long, glaucous; lamina thick and fleshy, 65 x 40 cm, glaucous, darker green above, lighter below and white to silvery, sometimes prominently whitish along nerves; blade often entire in juveniles, later divided into three or more irregular pairs of leaflets, with three to five nerves, leaves sometimes (rarely, e.g. **H1460*) with serrated leaf edges. Inflorescence infrafoliar, pendent, with 3–4 branches; prophyll thin, papery, brown, often lingering though shrivelled; peduncle short c. 10 cm, 6 mm wide; rachillae slender, to 15 cm, reddish, with distichous floral pits. Staminate and pistillate

flowers not seen. Fruit distichously borne, c. 24 pairs per rachilla; immature drupes light green with darker tips, ellipsoid, elongate and pointed, ripening to buff colour then blood red to black, broadening ellipsoid, c.12 x 10 mm; testa fibrous. Seedling leaf entire-bifid, acute, dark green, glabrous.

Notes: This handsome and elegant palm is relatively rare, found so far in Johor from Gunung Panti (where I first saw it) to Kahang, Mersing Forest Reserve, and at its type location in Bukit Jamari (Plate 3), which its epithet identifies. Its glaucousness is indeed quite diagnostic, and the thick white

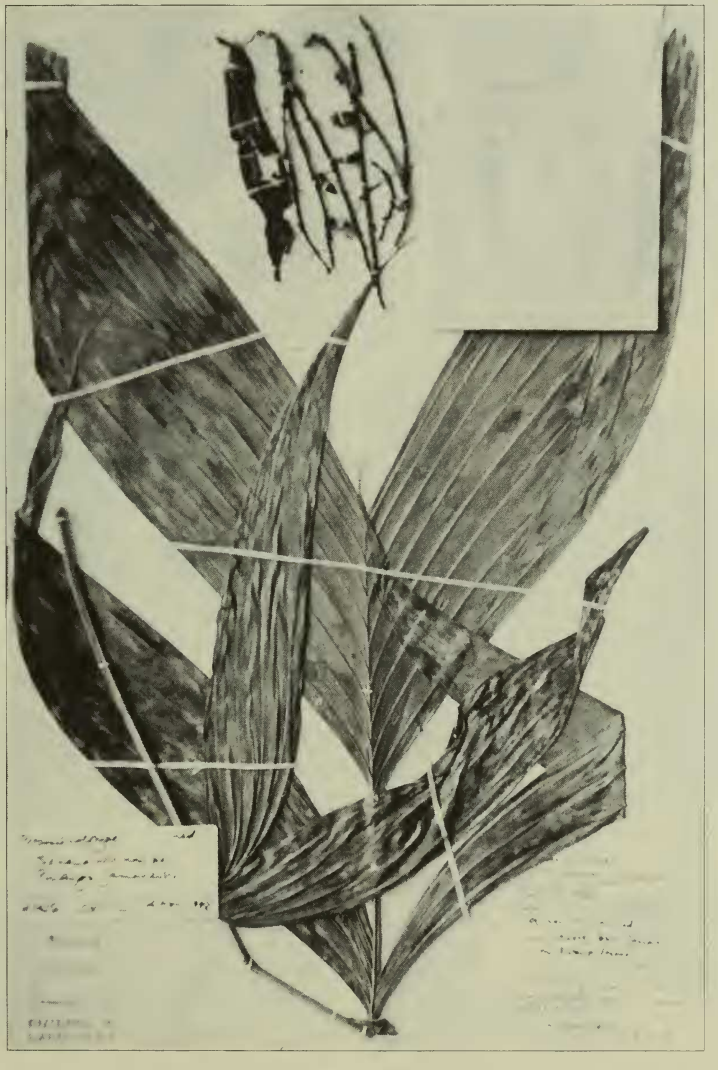

Plate 1. *Pinanga jamariensis* C.K.Lim (holotype: 1993, *C.K.Lim H1456*, SING). By courtesy of SING.

Plate 2. *Pinanga jamariensis*, leaves and inflorescences (**H1455*).

Plate 3. *Pinanga jamariensis,* solitary palm at Bukit Jamari, Johor.

Plate 4. *Pinanga jamariensis,* young adult plant.

leaves with fewer and broad leaflets (Plates 2 & 4) tell it apart from *P. auriculata* Becc. var. *leucocarpa* C.K. Lim (synon: *P. patula sensu* Ridley *non* Blume, see Lim, 1998) found in the same areas, which, however, has leaves with more numerous leaflets that are glabrous and sigmoidal in shape, and fruits that are globose and creamy white when immature, resembling those of *P. limosa* Ridley. Juvenile stages of the new species may indeed also look similar to the diminutive *P. limosa*, which occasionally has glaucous leaves, entire or dissected, and similarly thick; the eophylls are practically indistinguishable, and suggest an affinity within what might be called the *'limosoid* group'. Curiously, in these two *Pinanga* taxa, serrations to leaf edges beyond the apical teeth have been observed (which I have also seen in *P. subintegra* Ridley), although as a rare occurrence.

Although compared with *P. auriculata* Becc. var. *merguensis* C.K. Lim (1998), the precedent variety, in the diagnosis (the habit and infructescence are similar), the drupes of that taxon are, however, different in colour, being distinctively shiny, wine-red, and its leaves (similarly with var. *leucocarpa*) are glabrous, and quite different in dissection and shape. Furthermore, their respective domains are geographically distant and disjunct. The new species is often sympatric with *P. auriculata* var. *leucocarpa,* as mentioned above, and also with *P. limosa, P. simplicifrons* (Miq.) Becc. and the other new species to be described in this paper, *P. johorensis*, and *P. singaporensis* Ridley in the Kahang area and at Gunung Panti.

It may be found fruiting at less than 2 m in height, contrasting with the surprisingly tall individuals towering at over 8 m, with disproportionately slender stems, able to endure in wind-sheltered habitat at Jamari, where *P. johorensis* and *Johannesteijsmannia altifrons* Reichenb.*f.* & Zoll. are also luxuriant. This new and attractive *Pinanga* can easily become endangered due to deforestation, as at Kahang, where it is already rare, and may require protection.

Distribution: Johor: Mersing F.R., Bukit Jamari, Kahang, Gunung Panti.

Habitat: lowland dipterocarp forest, to 50 m a.s.l., not common.

Specimens examined: Johor: Gunung Panti, 1990, *C.K.Lim *H0515*, Bukit Jamari, 1991, *C.K.Lim H1004* , 1992, *C.K.Lim H1149* , 1993, *C.K.Lim H1455,* 1993, *C.K.Lim H1457* (SING), *C.K.Lim H1402, H1459, H1460, H1526*, 1994, *C.K.Lim H1674, H1682*, 1995, *C.K.Lim H1895, H1923* , 1996, *C.K.Lim H195*.

2. *Pinanga johorensis* C.K.Lim & L.G.Saw **sp. nov**

A P. malaiana minor, rachillis plerumque 2-ramulis, longis stolonibus bene distincta.

Typus: Johor: Lenggor F.R., 1993, *L.G.Saw FRI 37435* (holotypus KEP, isotypus K).
Plates 5–7.

Clustering, pleonanthic, monoecious palm. Stem with basal suckers forming very loose clumps, stoloniferous with distant stems up to 3 m apart; stem to 7 m tall, slender to 3 cm diam.; nodal scars conspicuous, 1 cm wide, internode to 15 cm apart; stem surface green, sometimes sparsely lepidote, with brown scales. Crownshaft to c. 65 cm long, dark green, sometimes glaucous, conspicuously swollen in developing inflorescences. Leaves six to nine in crown; leaf sheath to 32 cm long, glaucous on freshly exposed parts, prominently lepidote on older parts; leaf with sheath to 1 m or longer; petiole to 38 cm long, c. 1 cm diam., slightly channelled adaxially, round abaxially, lepidote; leaflets acuminate, often five to seven regularly arranged on each side of rachis, broad with 4–5 nerves (sometimes with 17 to 22 pairs of leaflets, each with fewer nerves), the apical leaflets broader, very prominently toothed and deeply lobed; lamina up to 122 cm long by 75 cm wide, shiny green, coriaceous, drying dull greenish brown on upper surface, darker brown on abaxial surface. Inflorescence infrafoliar, pendulous; prophyll from immature inflorescence elliptic, strongly two-keeled, pink when fresh; peduncle short to 1.5 cm long, flattened, wide at the prophyll scar; rachillae two, rarely three, with floral triads arranged distichously. Immature staminate flowers asymmetrical, sessile; calyx with three free triangular unequal lobes, c. 2 mm long; corolla with three well-developed ovate lobes, joined shortly below; stamens c. 38. Immature pistillate flower sessile; globose, calyx with three triangular, ciliate-margined lobes, about the same size as calyx lobes; staminodes absent; ovary cylindrical to ovoid, c. 1.5 x 1 cm; stigma with short style c. 0.5 mm long, 0.5 mm wide; stigma irregularly lobed and flattened. Infructescence infrafoliar strongly reflexed, up to 22 cm long. Immature fruits buff coloured with pink tips, maturing to bright red and black, with black calyx and corolla, borne on coral red rachillae. Mature fruit ellipsoid to 3 x 1.5 cm, with a distinct low collar surrounding the apical stigmatic remains; epicarp smooth; endocarp with conspicuous longitudinal fibres; seed adhering to endocarp, 1.5 x 1.2 cm, attached basally; endosperm deeply and irregularly ruminate; embryo basal.

Plate 5. *Pinanga johorensis* C.K.Lim & L.G.Saw, stoloniferous palm at Bukit Jamari.

Plate 6. *Pinanga johorensis*, note toothed apical leaflets.

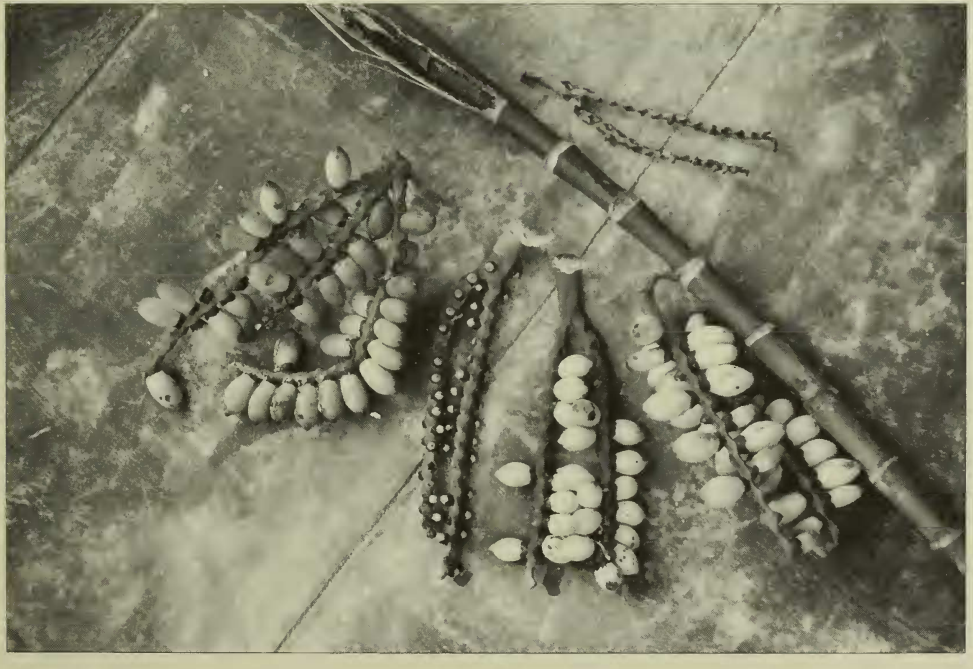

Plate 7. *Pinanga johorensis*, inflorescences and fruit, Kahang, Johor (**H0744*).

Notes: This smaller relative of *P. malaiana* (Mart.) Scheffer has undoubtedly been often confused with its larger kin, and perhaps many herbarium specimens still exist under that appellation. It can frequently be seen along the road from Kluang to Jamaluang, where it is under threat from forest clearance, and at Bukit Jamari (Plate 5). Apart from the two-, sometimes three-branched rachillae (Plate 7), it can be differentiated by the slender stems growing out of surprisingly distant stolons, and its fewer broad leaflets with the apical leaflets prominently toothed (Plate 6), although multi-pinnate forms with narrower leaflets can also be found. In the field, the swollen leaf sheaths have been observed to be penetrated by insects eager to ravage the inflorescence within; one rarely sees exposed flowers in anthesis. After abscission the prophyll may sometimes be erect, but are usually deflexed.

It is relatively widespread in Johor, justifying its epithet. From the Lenggor F.R. to Mersing, it grows sympatrically with *P.limosa, P. palustris* Kiew (see below), *Nenga grandiflora* Fernando, and *N. pumila* var. *pachystachya* (Blume) Fernando, *I. geonomiformis* Griff. ex Mart., *I. asli* C.K. Lim, and the rattans of the area including *Korthalsia echinometra* Becc., and *K. flagellaris* Miq.. Ridley's 1903 specimen indicates its presence in Singapore. Further research might possibly yield collections in Sumatra and the Riouw islands.

Distribution: Johor, Lenggor F.R., Mersing F.R., Bukit Jamari; Singapore.

Habitat: lowland dipterocarp forest, to 80 m a.s.l.; common palm.

Specimens examined: Johor: Kota Tinggi, Mawai, 1959, *Tan Ah King 23A* (SING), Kahang, Kg. Sri Lukud, 1990, *C.K.Lim *H0512*, 1991, *C.K.Lim H0745, H0970, H1051, H1057*, Bukit Jamari, 1991, *C.K.Lim H1003*, 1993, *C.K.Lim H1458* (SING), *H1400, H1525*, 1994, *C.K.Lim H1683*, 1995, *C.K.Lim H1896, H1924*, Labis F.R., 1966, *T.C.Whitmore FRI 0187* (SING), 1970, *T.C.Whitmore FRI 15618* (KEP), 1993, *C.K.Lim H1519* , Lenggor F.R., 1993, *C.K.Lim H1588, H1589* ; Singapore: Bukit Panjang, 1903, *Ridley 1841* (SING).

3. *Pinanga palustris* Kiew **sp.nov.**

A P. malaiana fructibus grandibus infructescentia erecta et interfoliacea differt.

Typus: Pahang: Sg. Kinchin, 1989.*R. Kiew RK2806* (holotypus KEP).
Plates 8–9.

Robust, clustering palm, clumps c.1 m across at the base, consisting of 10 or more stems with leafy canopy more than 3 m across. Majority of stems in clump either short and completely covered by leafsheaths, or are basal suckers with undivided leaves. Juvenile undivided leaf with lamina up to 50–80 cm by 14–17 cm with a deep apical notch, apical leaflet prominently toothed, petiole c. 65 cm long. Tallest stem in clump 1.5–3.5 m tall and 3 cm thick with whitish annuli 1–2 cm apart, and c. 1 cm wide. Individual stems with c. 3 leaves. Crownshaft c. 25 cm long, lower 1–2 leafsheaths dead and partially rotten. Leafsheath 15 cm long, reddish-brown, or stems yellow within sheath, persistent. Petiole 1.5 m long, yellowish-green, glabrous, channeled above. Lamina pinnately divided, up to 2.5 m long and 90 cm wide, with six to eight pairs, not constricted at insertion, mid-leaflets c. 60 cm by 5 cm, each with three to four veins, veins minutely furfuraceous on lower surface, distal leaflets 35–40 cm by c. 6 cm, with deeply serrate margin, with teeth 1.5–3 cm long. Inflorescences interfoliar, produced in lower leaf axils and only emerging through rotten leafsheath when in fruit, glabrous, stout, erect, peduncle flattened 2–3 cm by 1–1.5 cm, thickening and becoming 2 cm wide in infructescence; rachillae two to three (rarely four), 10 cm long and 5–10 mm wide, flattened, in infructescence yellowish with ruby red or crimson hue. Fruit scar circular, flat c. 10–12 mm across. Prophyll 9 cm by 3.5 cm, rosy red or white flushed at apex when immature. Flower triads alternate and distichous, 3–4 mm apart. Male flowers (from immature inflorescence) with perianth parts fleshy, more or less triangular, stamens 30 plus (to 44), and sessile with oblong anthers. Female flowers with three imbricate sepals, broadly ovate with minutely apiculate apex, 4 mm by 8 mm; petals three, apically valvate, basally imbricate, with acute apex, 8 mm by 5 mm, margin finely ciliate. Ovary with capitate stigma. Immature fruit ellipsoid and peachy-pink in colour, swelling when ripening, ovoid, 30–35 mm by 18 mm and rosy-red to black. Calyx persistent, black in fruit. Epicarp smooth and matt with apical "nose" 3 mm long, mesocarp spongy, endocarp fibrous. Seed deeply ruminate.

Notes: In Kiew and Dransfield (1987), this species was referred to as *Pinanga* aff. *mirabilis* and was subsequently listed as such in several checklists. The current epithet denotes its characteristic swamp and wet habitat. It does resemble the Bornean *P. mirabilis* Becc. not only in habit and habitat, but also in the large size of fruit (up to 25 x 12 mm in the latter). The new taxon is quite different from the other large *Pinanga*, *P. malaiana*, which has taller and distinct stems, although caespitose, not clumping, and having longer pendulous infructescences with red to shiny black drupes, which are not as large.

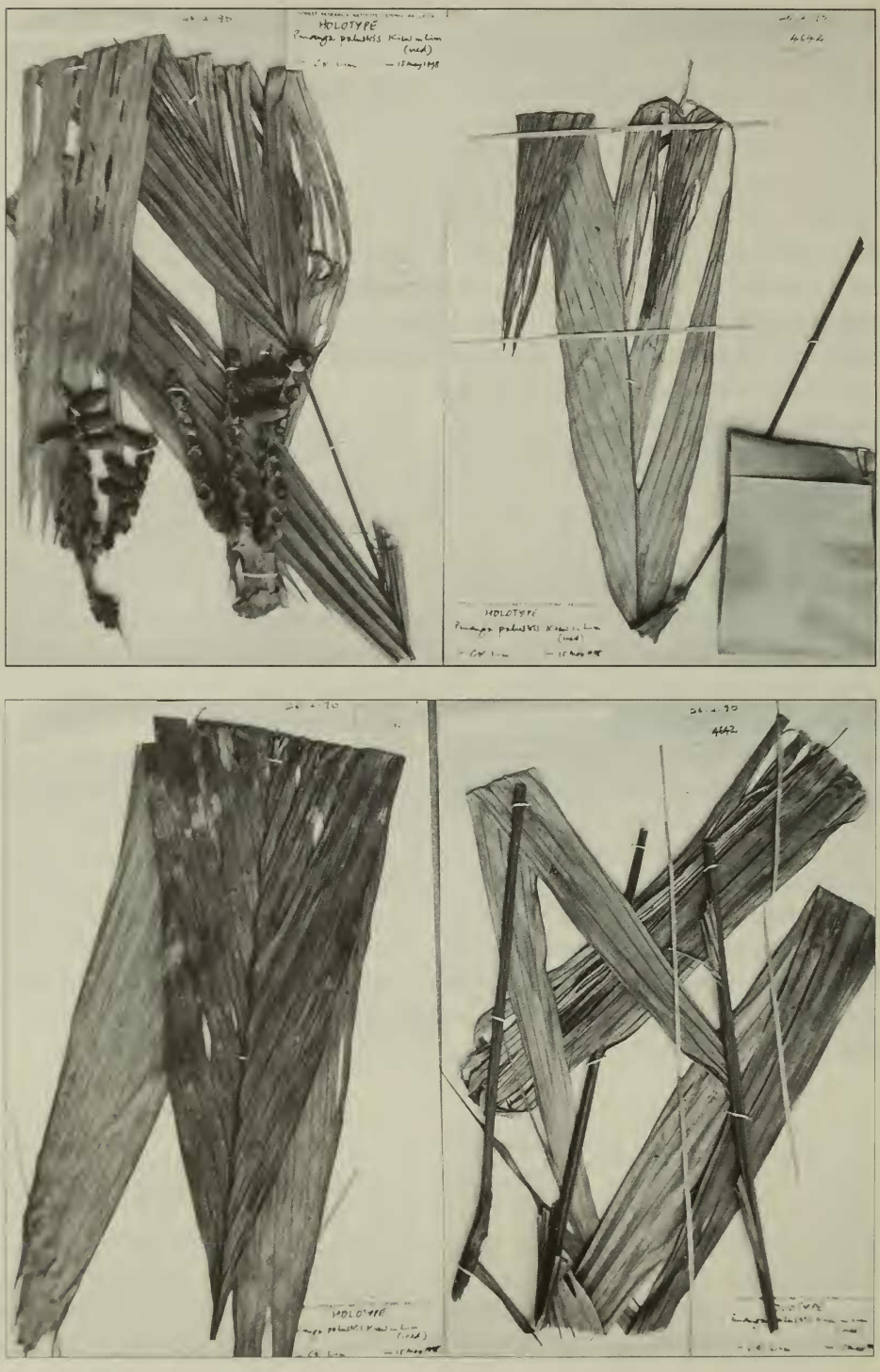

Plate 8. *Pinanga palustris* Kiew (holotype: 1989, *R.Kiew 2806* KEP). By courtesy of KEP.

Plate 9. *Pinanga palustris*, with leafsheaths stripped, at Kahang, Johor.

P. mirabilis has leaves which are usually entire, although pinnate plants are not uncommon and are sometimes sympatric (Dransfield, 1991); the stems are taller, up to 5 m, but usually 2–3 m, cleanly exposed by the abscissing leaves, which also reveal pendent or infrafoliar inflorescences, although some have been observed to be erect as at Lambir Hills; its fruits are different in colour when immature, a brownish-pink, whereas they are coral red in *P. palustris*. Again, the Malayan species has characteristic orange stems, when revealed by stripping the rotting leafsheaths (Plate 9), and so far, no large entire-leaf forms have been encountered, barring the juveniles.

As for *P. johorensis*, many herbarium specimens of this new taxon have been filed under *P. malaiana*. Furtado in his determinations (at SING) had noticed differences, and began to suggest comparisons with *P. malayana* (Griff.) Scheff. var. *sumatrana* Becc. or with *P. malayana* var. *baramensis* (*P. malaiana* (Griff.) Scheff. var. *barramenis* Becc. in Martelli), which are Sumatran and Bornean taxa respectively, the latter since reduced under *P. mirabilis* by Dransfield (1991).

Distribution: Johor: Ulu Endau, Lenggor F.R., Kahang, widespread, also Pahang: Rompin, Kedaik.

Habitat: usually along sides of streams, or in swampy places, sometimes on hills up to 300 m as observed at Ulu Endau on sandstone, growing among *Johannesteijsmannia altifrons*.

Specimens examined Johor: Mawai, 1935, *Corner & Furtado 29240* (K, SING), 1959, *Tan Ah King 23* (SING), Sg. Kayu, 1937, *Keah 32423* (SING), Gunung Panti East, 1892, *Ridley s.n.* (SING), 1973, *J. Dransfield JD3044* (SING), Ulu Endau, *Dransfield JD3548* (SING), *B.H. & R. Kiew RK1613* (KEP), 1977, *J. Dransfield & F.W. Fong JD5040* (K, KEP), Sg. Sempanong 1985, *R. Kiew RK1743* (KEP), Kuala Marong, 1985, *R. Kiew RK1761* (KEP), Kahang, 1990, *C.K.Lim *H0279, H0426, H0533*, Lenggor F.R., 1991, *C.K. Lim H0933*, *L.G. Saw et alia FRI 37439* (KEP), Ulu Sedili, 1991, *C.K. Lim H0929*; Pahang: Sg. Kinchin (see type), Endau-Rompin, 1985, *C.M. Low FRI 25900* (KEP), Kedaik, 1991, *C.K. Lim H1001*, Lesong F.R., 1992, *L.G. Saw FRI 37532* (KEP), 1993, *L.G. Saw FRI 38522* (KEP).

4. ***Pinanga pantiensis*** J.Dransf. **sp. nov.**

Inter species Malayanas rachillis luteis vel aurantiacis valde fractiflexis bene distincta, P. pachyphyllae, specie Borneensis, verosimiliter affinis sed textura et dissectione folii et rachillis fractiflexis differt.

Typus: Johor: Kota Tinggi, Gunung Panti.F.R., 1973, *J. Dransfield et alia JD3048* (holotypus SING).
Plates 10–13.

Clustering undergrowth palm to 6 m tall. Stem c. 20 mm diam., green with grey-brown leaf scars; internodes 40–50 mm long, with scattered caducous black scales when newly exposed. Crownshaft c. 35 cm long; sheaths pale green, c. 25 cm long, striate when dry, minutely dotted with small caducous

scales. Leaves arcuate, to 2 m long; petiole c. 50 cm long, c. 5 mm diam. near base; rachis light orange-yellow when fresh; leaflets 10–16 on each side of the rachis, arcuate, diverging at angle of about 30 degrees from the rachis, the longest to 38 x 3 cm, very coriaceous, glossy green when fresh, acuminate and consisting of three to ten folds except for the apical two leaflets on each side, consisting of three to ten folds and lobed to a depth of 1 cm at the tips; transverse veins conspicuous, close, leaflet surfaces glabrous, ramenta absent. Inflorescence infrafoliar, known only in immature to mature fruiting state, to 15 cm long with three to five branches; prophyll 14 x 4 x 2 cm, thick, yellow green; peduncle c. 3 cm long, c. 8–10 mm wide at the base, tapering to 2 mm wide, rachillae conspicuously zig-zag, yellow to orange; rachilla bract triangular, c. 2–4 mm, flower scar 4 mm diam. Immature fruit green, mature fruit satiny-black, ovoid, 32–35 x 15–17 mm; epicarp minutely striate, pericarp c. 4 mm thick. Seed 10 x 20 mm, endosperm deeply ruminate; embryo basal. Seedling leaf coriaceous.

Notes: When Dransfield recognised this as a new taxon, after viewing herbarium records deposited by Corner as early as 1936, and from his own collections, it was thought to be localised and endemic to the unique flora of Gunung Panti, hence the epithet. The species has since been found in adjacent areas in Johor, especially at Linggiu where the recently constructed dam has diminished its population, further threatening what is undoubtedly a rare palm. On a recent collection trip to that locality, on the stems of the few residual plants the internodes were seen to vary from 13 cm at the base, to 4 cm at the upper end, providing an indication of effects on growth, perhaps due to ecological change and disturbance.

In appearance the taxon resembles *P. malaiana*, though it is not observed to be as tall or robust. Although clustering, it usually has one or two dominant stems (Plate 11). The pinnae are usually narrower and more widely spaced (than in *P. malaiana*), and are characteristically tough and stiff. The inflorescence is its striking feature (Plate 12), with zig-zag rachillae, often bright yellow in colour and glossy black fruit (Plate 13). The recently described palm from Khao Sok in Thailand, *P. fractiflexa* Hodel (1997), has wavy but green, and not so strongly fractiflexing rachillae.

Distribution: Johor: Linggiu, Kota Tinggi, Gunung Panti F.R.(east).

Habit: Hill slopes, ridge top, dipterocarp forest, to 250 m a.s.l.

Specimens examined: Johor: Linggiu, 1992, *C.K. Lim *H1343*, 1993, *C.K.Lim H1530,* 1998, *H2001;* Kota Tinggi, 1957, *T.C. Whitmore 63* (SING); G. Panti, Ulu Segun (300m alt) 1936, *Corner SFN 30659* (SING); G. Panti

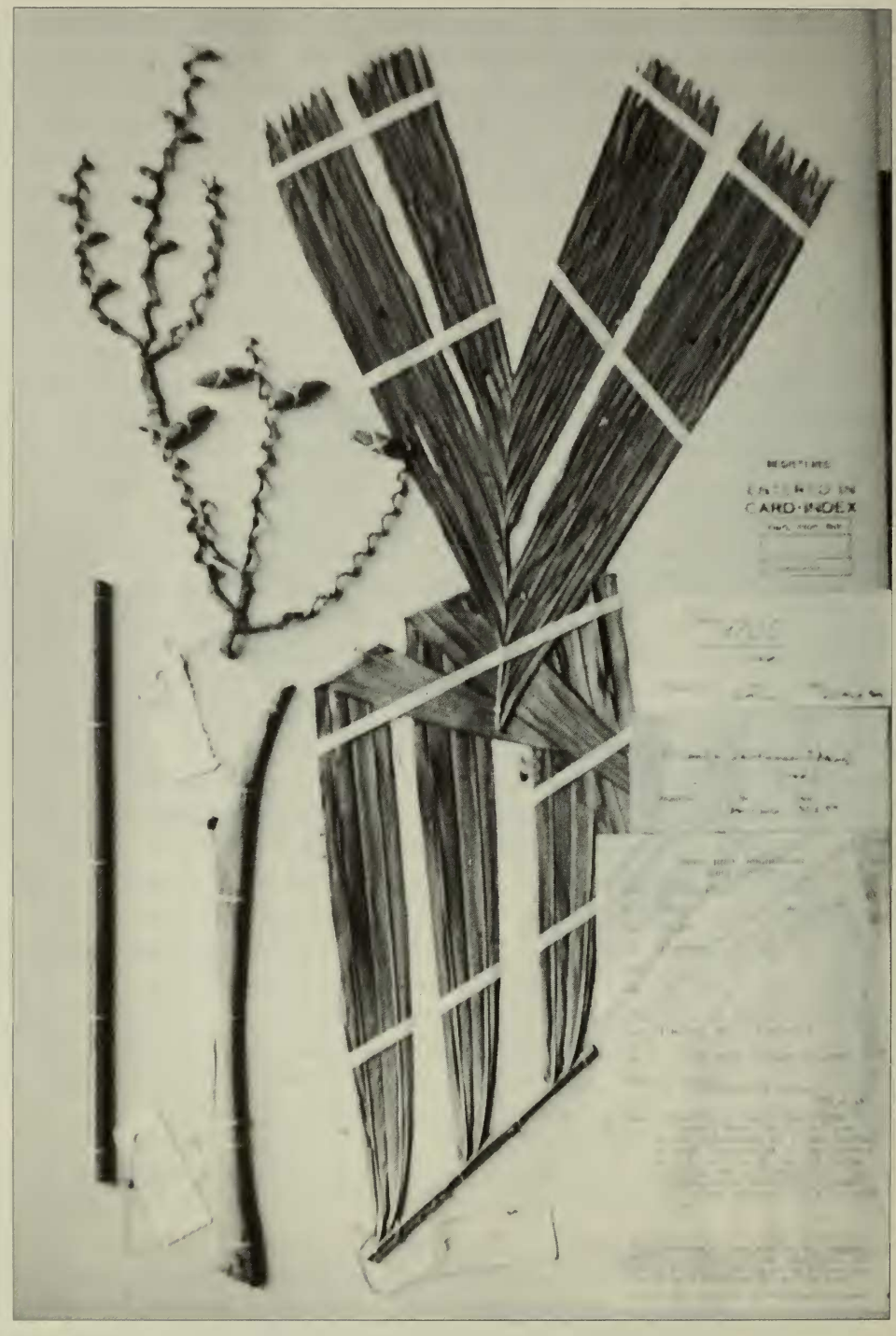

Plate 10. *Pinanga pantiensis* J.Dransfield (holotype: 1973, *JD3048* SING). By courtesy of SING.

Plate 11. *Pinanga pantiensis*, dominant stem in clump, at Linggiu, Johor.

Plate 12. *Pinanga pantiensis*, inflorescences infrafoliar.

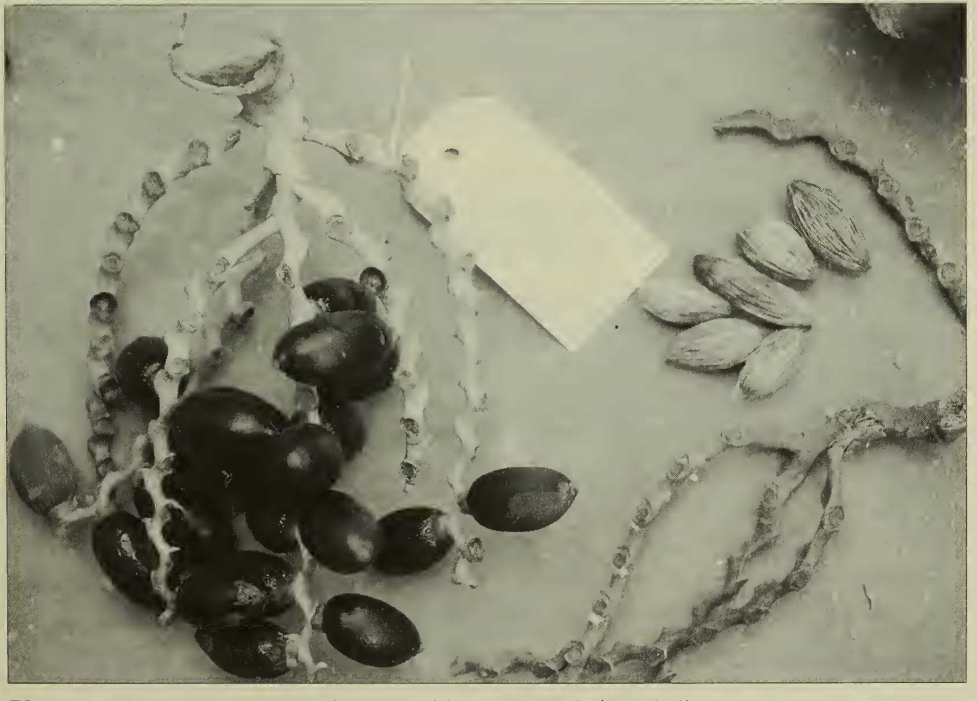

Plate 13. *Pinanga pantiensis*, zig-zag rachillae, and fruit (**H1343*).

(forested eastern slope, 300m alt.) 1967, *T.C. Whitmore FRI 4515* (KEP), 1967, *Suppiah FRI 98978* (KEP); Ulu Sedili, 1991, *C.K. Lim H0926*;

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