

Notes on *Pinanga* (*Palmae*) in Sarawak

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Summary. Three new Bornean palms, *Pinanga cucullata*, *P. rupestris* and *P. pachyphylla*, are described and *P. malaiana* var. *barramensis* included in synonymy with *P. mirabilis*.

Pinanga is an extraordinary genus in Borneo; it is represented by many species and displays great variation in size, form and ecology. Adjacent valleys often carry different species. Some, such as *P. salicifolia* Bl., are very widespread, while others, such as the three described as new in this paper, are very local. Since my last paper on the genus *Pinanga* in Borneo (Dransfield 1980), more new taxa have been discovered.

After a period during which the number of species of *Pinanga* in cultivation was very limited, the requirements of several species seem now to be understood, and there is an increasing interest in collecting these beautiful palms. Seed production is usually low, so the collecting of seeds from small populations of very local species must have a deleterious effect on regeneration in the long term. The forests of Borneo are being destroyed or severely degraded at an alarming rate and the fate of some of these local palms must be very uncertain. A balanced approach to seed collecting should be sought. The guidelines of Chazdon (1988) are, I believe, an excellent beginning. If *Pinanga* species such as the three described as new here are to survive, then not only must their habitat be protected, but palm collectors must also show restraint, and leave some seeds for natural regeneration.

In Sarawak, with its astonishingly diverse palm flora, more new species of *Pinanga* will undoubtedly be discovered, so that a full account of the genus in Borneo as a whole seems premature. Nevertheless it seems appropriate to describe the following three new species and give notes on the synonymy of a fourth as names are required for these taxa for conservation studies of palms in Sarawak.

***Pinanga cucullata* J. Dransf. sp. nov. *P. tomentellae* Becc. pagina inferiore laminae tomentella calyce floris pistillati connato affinis sed lamina profunde bifida, habitu dense caespitoso distinguibilis. Typus: Borneo, Sarawak, Dransfield et al. JD6072 (holotypus K; isotypi BH, BO, L, PNH, SAR).**

Slender colonial palmett spreading by short rhizomes or stolons; stem erect, rarely exceeding 60 cm long, 4–8 mm diam., internodes 3–4 cm long, the surface covered with dark brown scales and white hairs, adventitious branching sometimes occurring from the middle of the internodes. Crown of about 8 leaves, the sheaths forming an elongate crownshaft; leaf sheaths c. 11 × 1.4



FIG. 1. *Pinanga cucullata*. **A** stem showing base, several inflorescences and base of crownshaft $\times 2/3$; **B** upper part of crown $\times 1/2$; **C** detail of rachilla with pistillate flower $\times 7\frac{1}{2}$; **D** pistillate flower $\times 7\frac{1}{2}$; **E** one lobe of calyx $\times 15$; **F** petal $\times 15$; **G** young fruit $\times 3$. **H** fruit $\times 3$. All from S.5397. Drawn by Heather Wood.

cm, smooth, almost succulent when fresh, striate on drying, bearing scales and hairs as the internodes, distally with 2 short rapidly disintegrating auricles 6×3 mm; petiole very short, c. 20×2.5 mm, bearing scales and hairs as the sheath; blade when fresh, dark shiny green adaxially, grey hairy abaxially, deeply bifid, the costa c. 5 cm only, the two lobes conspicuously cucullate, to 25×3 cm, with about 5 ribs, the tips entire rather than lobed, adaxial surface glabrous, abaxial surface densely grey-scurfy, particularly along the folds. Inflorescence unbranched or bifid, pendulous or porrect, to 8 cm; prophyll not preserved; peduncle very short, not exceeding 8 mm, c. 4 mm diam. near the base; rachilla c. 2×1 mm diam., pale cream, thickening and becoming red at fruit maturity, rather densely covered in caducous branched scale-like trichomes, and bearing strictly distichous triads of flowers. Staminate flowers (based on one very imperfectly preserved flower) c. 4×3 mm; calyx c. 0.5 mm high, irregularly 3-lobed; petals c. 4×2 mm, unequal; stamens at least 4 (exact number not known), filaments 0.5 mm, anthers elongate, 1.3 mm; pollen not known. Pistillate flower globular, c. 2 mm diam.; calyx gamosepalous, striate, c. 1.5 mm high, shallowly 3-lobed; petals imbricate, ovate, c. 1.5×1.5 mm, the margins minutely ciliate; staminodes absent; ovary ellipsoid, c. 2×1 mm, tipped with an irregularly lobed stigma. Mature fruit black, ellipsoid, c. 13×5 mm. Seedling not known. (Fig. 1).

BORNEO. Sarawak: 1st Division, Serian District, Sabal Tapang Forest Reserve, *Dransfield et al.* JD6072 (holotype K; isotypes BH, BO, L, PNH, SAR), *Dransfield et al.* JD4656 (BH, K, KEP, L, SAR), *Ilias Paie* S.5397 (K, SAR).

This is a pretty species, very distinctive in its cucullate bifid leaves of a curious almost succulent texture, adaxially shiny green and abaxially grey-hairy. It seems always to be found in 'kerangas' (Bornean heath forest) and, although all collections are from the same locality, I have observed it elsewhere in the 1st Division at Semengoh Forest Reserve near Kuching and in Sempadi Forest Reserve on the Bau-Lundu Road. Although abundant where it occurs, it is, like many kerangas palms, a shy flowerer. It seems most closely related both in vegetative and floral details to *P. tomentella* Becc.; the latter, however, is immediately distinguishable by its entire, lanceolate, scarcely bifid leaf.

Pinanga rupestris *J. Dransf.* sp. nov. habitatione egregia verosimiliter affinis *P. rivulari* Becc. inflorescentia spiciformi sepalis floris pistillati connatis et ramificatione internodiali sed lamina angusta integra breve bifida statim distinguibilis. Typus: Borneo, Sarawak, *Dransfield et al.* JD5917 (holotypus K; isotypi BH, L, SAR).

Diminutive clustering palmlet, erect or more usually pendulous from crevices in sandstone rock faces. Stems rarely exceeding 60 cm long, usually much less, c. 4–6 mm diam., conspicuously marked with nodal scars, internodes 1–3 cm, surface with scattered brown scales, stem base producing aerial roots and dense clusters of sucker shoots, the stem also frequently producing bulbil-like shoots from the middle of the distal internodes. Crown of about 6 leaves, the sheaths forming an elongate crownshaft; leaf sheaths c. 80×7 mm, striate on drying, covered in scattered dull brown scales, distally with a rapidly disintegrating lacinate ocrea to 16 mm; petiole of leaves of