

Persistent searching and poking around among the leaf sheaths revealed inflorescences. It seems to be confined to 'kerangas' forest at low elevations. It bears a superficial resemblance in habit to *C. castaneus* Griff. of Peninsular Malaysia, but the inflorescence and fruit suggest that its affinities are with the species of *Calamus* included by Furtado (1955) in the separate genus *Cornera* but subsequently retransferred to *Calamus* (Dransfield 1977)—species such as *C. lobbianus* Becc. and *C. conirostris* Becc. Among these it is immediately distinguishable by its unusual habit, that of a short squat 'tree'.

Calamus crassifolius J. Dransf. sp. nov. ad sectionem *Coleospathum* pertinens *C. insigni* speciei Malayana verosimiliter affinis sed folio unijugato foliolis crassis divergentibus distinctissima et ceteris speciebus *Calami* Sarawakensibus dissimillima. Typus: Borneo, Sarawak, *Dransfield et al.* JD 6035 (holotypus K; isotypus SAR).

Clustering, slender rattan climbing to 10 m tall; stem without sheaths c. 7–10 mm diam., with sheaths c. 10–18 mm diam., internodes c. 7–12 cm. Leaf sheath rich mid-green, armed with short, scattered or grouped, triangular green spines to 3 mm with conspicuous swollen bases, scattered caducous pale brown scales present between the spines; knee conspicuous, sparsely armed; ocrea present in emerging leaf, soon tattering and becoming inconspicuous. Flagellum to 1.5 m. Leaf ecirrate, to 75 cm; petiole 4–11 cm, adaxially flattened, rounded or keeled abaxially, very sparsely armed along the mid-abaxial line with reflexed black-tipped green hooks to 4 mm, with swollen bases; rachis very short, 5–7 cm, very sparsely armed as the petiole; leaflets a single pair only, to 60 × 12 cm, spatulate, stiff, cucullate, dark shining green when fresh, drying pale green, concolorous, of a very thick texture, with 7 major ribs, ± unarmed except for a few bristles at the tips, transverse veinlets very numerous, close, conspicuous. Inflorescence, only young pistillate known, to 27 cm, bearing 3 partial inflorescences and without a well developed terminal flagellum; primary bracts strictly tubular, the longest to 130 × 4 mm, with a short triangular blade, the whole covered in pale brown indumentum; first order branches to 8 cm, bearing c. 15 distichous scabrid tubular acuminate bracts to 7 mm, each subtending a rachilla; rachillae rather close, of ± equal length, c. 20 × 2 mm, drying blackish; rachilla bracts distichous, c. 1 mm long, minutely scabrid, striate, the margins finely toothed; involucre and involucrophore similar to the rachilla bract, together forming a cup c. 1.5 mm diam. Sterile staminate flower bud c. 1.8 × 0.9 mm; calyx striate, shortly 3-lobed, c. 1.8 × 0.9 mm; corolla c. 1.4 × 0.6 mm; sterile stamens with filaments c. 1.2 mm; pistillode c. 0.5 mm. Pistillate flower of size and shape similar to that of the sterile staminate flower; staminodes and pistil still very immature. Other parts unknown. (Fig. 8).

BORNEO. Sarawak, 1st Division, Sematan, Pasir Jangka Forest Reserve, *Dransfield et al.* JD 6035 (holotype K; isotype SAR), JD 6032 (BH, BO, K, L, PNH, SAR); Lundu, Sempadi Forest Reserve, Mile 23, *Dransfield et al.* JD 6045 (BH, K, L, SAR).

Calamus crassifolius is confined to 'kerangas' forest in the lowlands of the 1st Division of Sarawak. It is known from only three collections, of which one, the type, is fertile and at a very early stage of flower development. Nevertheless, this is a very distinctive taxon with its relatively large thick deeply and

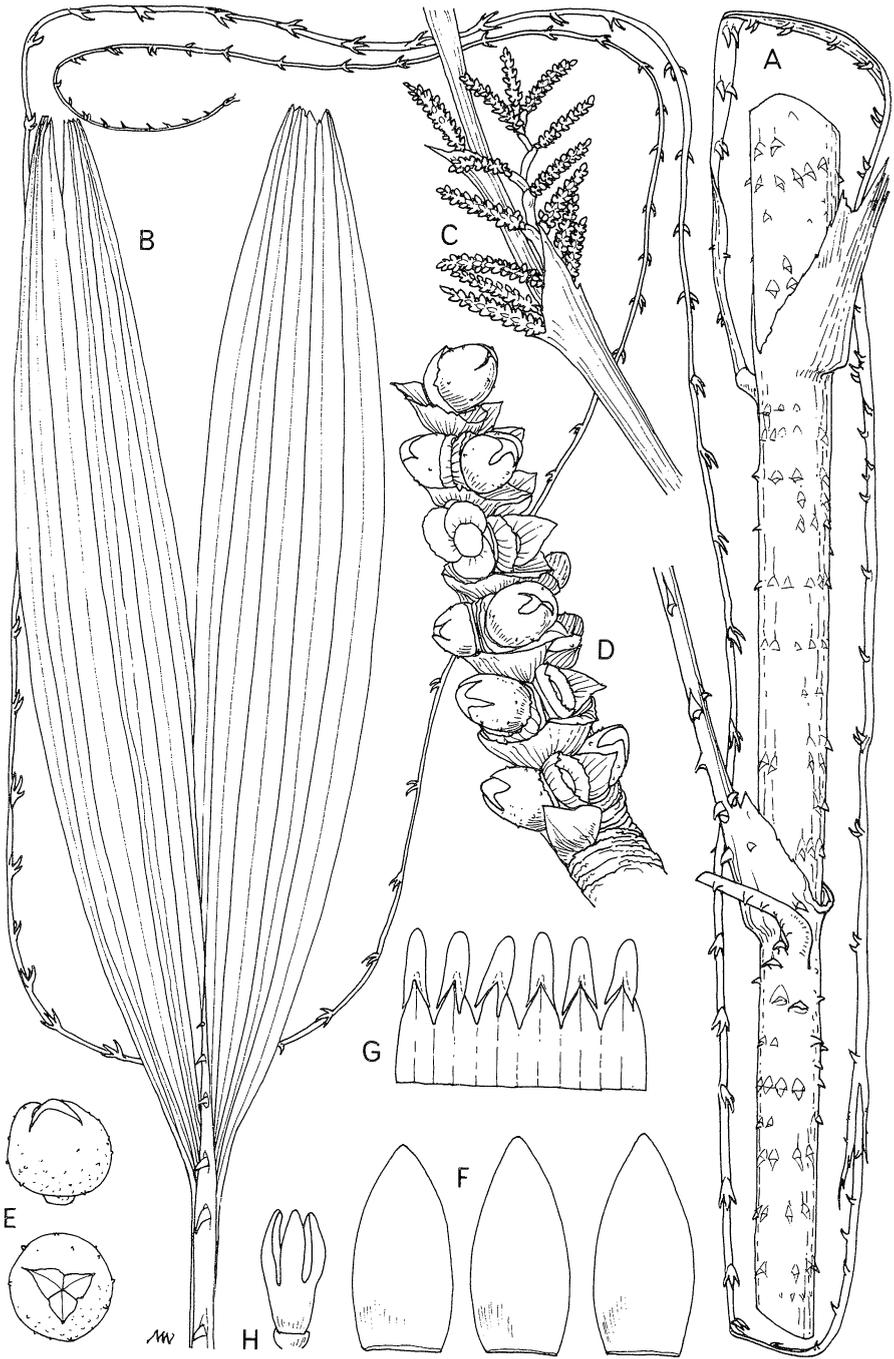


FIG. 8. *Calamus crassifolius*. **A** portion of sheathed stem $\times \frac{2}{3}$; **B** leaf $\times \frac{1}{3}$; **C** part of young pistillate inflorescence $\times \frac{2}{3}$; **D** part of staminate rachilla $\times 4$; **E** two views of sterile staminate flower $\times 6$; **F** petals $\times 12$; **G** staminodal ring $\times 12$; **H** pistillode $\times 12$. All from Dransfield et al. JD 6035. Drawn by Mary Millar-Watt.

divergently bifid leaves. In the possession of only two broad leaflets it might be confused with some forms of *C. flabellatus* but the latter species has the terminal leaflet pair joined for much of their length, the leaf is not of the same coriaceous texture and the flagellate inflorescence is altogether different in branch arrangement. The new species belongs to Section *Coleospathus* in Furtado's sense (Furtado 1956) and is perhaps most closely related to Peninsular Malaysian *C. insignis* Griff. and its allies.

***Calamus psilocladus* J. Dransf. sp. nov.** ad sectionem *Coleospathum* pertinens *C. nematospadici* et *C. compto* verosimiliter affinis vaginis foliorum inermibus, foliis infra dense scabridis, prophylo inflorescentiae flagellique spinis lateralibus conspicuis regulariter dispositis distinguibilis. Typus: Borneo, Sarawak, *Dransfield et al.* JD 6137 (holotypus K; isotypi BH, BO, L, PNH, SAR).

Solitary, slender rattan climbing to c. 5 m tall; stem without leaf sheaths 6–8 mm diam., with sheaths 9–12 mm diam.; internodes to c. 10 cm long. Leaf sheaths dull green, unarmed, covered in thin grey indumentum; knee conspicuous; ocrea poorly developed. Flagellum to c. 1.5 m, regularly armed in the basal c. 15 cm (i.e. the flagellar prophyll) with robust spines to 10 mm long, c. 15 mm distant, in two lateral rows. Leaf ecirrate, to c. 55 cm including the petiole to 10 cm; petiole flattened adaxially, rounded abaxially, armed with very sparse short spines and bearing scattered grey tomentum; rachis bearing adaxially a caducous felt of red-brown hairs; leaflets 24–34 on each side of the rachis, close regular, rather stiff, tending to become plicate on drying, the longest near the leaf tip to 15 × 0.7 cm, near the base to 6 × 0.5 cm, sparsely bristly adaxially and along the margins, abaxially densely scabrid; transverse veinlets rather inconspicuous. Inflorescences slender, elongate, to 1 m with 2–4 partial inflorescences, the staminate and pistillate superficially similar; prophyll armed as in the flagellum; subsequent rachis bracts only sparsely armed but tending to be bearded at their tips; partial inflorescences pendulous, to 40 cm, bearing 6–8 rather distant rachillae, each subtended by a minutely flared bract; staminate rachilla 10–25 × 1.5 mm, very rarely branched at the base, bearing strictly distichous, brown striate bracts to 1 mm; involucre triangular, c. 0.75 mm; pistillate rachilla to 40 × 2 mm, bearing strictly distichous brown striate bracts to 2 mm; involucre and involucrophore c. 1 mm. Staminate flower c. 2 × 0.75 mm; calyx cupular, tubular in the basal 0.5 mm with narrow triangular striate lobes to 1 mm; petals to 2 × 0.75 mm, scarcely striate; stamens elongate, c. 1 × 0.1 mm; pistillode slender, trifid, c. 0.8 mm. Pistillate flower not available. Mature fruit rounded, c. 8 mm diam., with beak to c. 2 × 1 mm, and covered in 13–14 vertical rows of yellowish to ivory-coloured scales with brown tips. Seed rounded, slightly flattened on one face, c. 5 mm diam., the surface shallowly ridged and grooved; endosperm homogeneous; embryo basal. (Fig. 9).

BORNEO. Sarawak, 1st Division, Mile 74 Kuching to Simanggang Road, forest near Pundajaya Timber Camp, *Dransfield et al.* JD 6137 (holotype K; isotypes BH, BO, L, PNH, SAR), JD 6135 (BH, BO, K, L, SAR).

This species is clearly a member of Furtado's section *Coleospathus* and is perhaps most similar to *C. comptus* and *C. nematospadix* in the slender stems, crowded regularly arranged linear leaflets and very slender filiform