

smaller; partial inflorescence to 7 cm, bearing one branch and the remains of three flowers; other parts not known (the mummified inflorescence may well prove to be depauperate). Fig. 6.

SABAH. Labuk & Sugut District, Mile 60, Sandakan–Telupid Road, *Dransfield et al.* JD5816 (holotype K; isotypes KEP, L, SAN, SAR). Penampang District: Crocker Range, Mile 28, Sinsuron Road, *Dransfield et al.* JD5543 (K, SAN, SAR); Kinabatangan District: Segaliud–Lokan F. R., Virgin Jungle Reserve, Mile 42, *Dransfield et al.* JD5773 (K, SAN, SAR); Labuk & Sugut District: Slopes of Bt. Masasau, *Dransfield et al.* JD5750 (K, KEP, L, SAN, SAR).

Calamus convallium is an infrequent rattan, known only from Sabah where it seems to be confined to soaks in valley bottoms; I did not see it as a stream-side plant, but always in squelchy valley bottoms or very wet slopes. It has a wide altitudinal range being found from lowland Dipterocarp forest at about 50 m above sea-level right up to lower montane forest at 1400 m. Once I observed it growing in forest on ultrabasic rock.

The affinities of this new species seem to lie with the species included by Furtado in his genus *Cornera* (now reduced to *Calamus*—Dransfield (1978)—Beccari's Group XVI); there are also similarities with *C. peregrinus* Furtado which Furtado included with *C. exilis* and others in his § *Macropodus*, a perhaps heterogeneous section. Unfortunately, as already observed, no fruiting material or pistillate flowers of *C. convallium* have been collected. *C. convallium* in its vegetative characters is unlike any other species known to me, and presents a very curious combination of characters. The long subcirrate leaf with its distant pairs of divergent leaflets and minute apical leaflets, and the poorly developed flagellum are highly diagnostic. Although *C. convallium* appears so aberrant and conspicuous to the rattanologist, it could easily be overlooked in the field. The specific epithet refers to its habitat. The cane from the tallest specimen observed in the Crocker Range, appeared to be of good quality.

10. ***Calamus pratermissus*** *J. Dransf.* sp. nov. ad sectionem *Coleospathum* Furtadonis pertinens *C. raduloso* Malayae affinis sed vaginis foliorum spinis amplitudinum duarum dense tectis, foliolis plerumque lanceolatis distantibus fructibus ovoideis distincta. Typus: Borneo, Sabah, *Dransfield* JD5587 (holotypus K; isotypus SAN).

Clustering high-climbing rattan with stems ultimately to 25 m or more in length; stem without sheaths to 18 mm diam., usually less, sometimes very slender in juvenile specimens, with sheaths to 35 mm; internodes to 18 cm. Sheaths dark green armed with abundant and diverse mid-brown, pale green bulbous-based spines, the spines usually of two major kinds, large spines to 30 × 7 mm, and smaller spines to 7 × 3 mm, the smaller spines frequently arranged in partial whorls or oblique groups and the larger scattered over the surface; more rarely the spines not differentiated into small and large; most spines horizontal or slightly reflexed; spines around leaf sheath mouth usually narrow and erect, to 15 mm; pale brown indumentum abundant between the spines; knee conspicuous, usually armed as the sheath but spines usually of the smaller type only. Ocrea low, membranous, unarmed. Flagellum well-developed, heavily armed, to 3 m. Leaf ecirrate, arcuate to 1.2 m; petiole

10–20 cm, long, 20×8 mm in cross-section, channelled on adaxial face, armed with rigid triangular black-tipped spines on abaxial surface, on the margins and occasionally on the adaxial surface; leaflets c. 12–20 on each side of the rachis, rather distant and arcuate, regularly arranged, lanceolate, rarely narrowly so; proximal leaflets to 35×2 cm; mid-lamina leaflets $35\text{--}45 \times 3\text{--}7$ cm, usually at the broad end of the range; apical leaflets to 23×2.5 cm joined to each other briefly along mid-line; leaflets armed with short black bristles on 3–7 main veins on the abaxial surface and along margins particularly at the tip, adaxial surface unarmed; transverse veinlets conspicuous. Staminate inflorescence to 3 m, with five or more partial inflorescences, branched to four orders; peduncle to 10×6 mm in cross-section at the insertion; prophyll tightly tubular to 60 cm, densely armed throughout with small bulbous-based spines, subtending first partial inflorescence; partial inflorescences to 1.1 m, bearing close-sheathing, short-spiny bracts to 10 cm each subtending a 2nd order branch to 50 cm long, it too bearing short-spiny almost scabrid bracts subtending 3rd order branches to 20 cm long bearing c. 6 rachillae on each side, each subtended by a sparsely scabrid bract; rachilla to 5 cm, somewhat zig-zag, bearing up to 10 staminate flowers on each side; rachilla bract to 2 mm long with a short triangular limb; involucre c. 1 mm, the areolus c. 1 mm diam. Staminate flower to 4×1 mm; calyx tubular in proximal 1.5 mm, with three triangular lobes to 0.75×1 mm with scattered brown indument; corolla tubular at the very base, with three acute sparse-indumentose petals to 3.5×0.8 mm; stamens six, with anthers to 2.5×0.4 mm; pistillode c. 1.5×0.2 mm. Pistillate inflorescence as the staminate but branched to two orders only; rachilla up to 10–14 cm long, the rachilla bracts to 5 mm long, very sparsely to rather densely scabrid and indumentose, rarely \pm unarmed. Sterile staminate flower as the fertile. Pistillate flower (in bud) to 4×2 mm; calyx to 4 mm long with three short triangular brown scaly lobes; corolla to 4 mm long with three lobes, scaly as the calyx; staminodes flattened, to 2 mm; ovary (still very young) to 2.5×1 mm tipped with the pyramidal stigmas. Ripe fruit ovoid, to 12×9 mm, with a beak to 2.5 mm; scales arranged in 15 vertical rows, pale brown with a darker marginal line. Seed to $9 \times 7 \times 5$ mm, deeply pitted, the endosperm subruminate; embryo basal. Seedling leaf unknown. Fig. 7.

SABAH. Tenom, Paling-paling Hills, near Lagud, *Dransfield et al.* JD5587 (holotype K, isotype SAN), JD5586 (K, SAN); Papar, Mile 30, Keningau–Kimanis Road, *Dransfield et al.* JD5605 (K, KEP, SAR, SAN), JD5610 (K, SAN); Keningau, Kg Pauh, *Castro* 1629 (K, SAN); Labuk & Sugud, slopes of Bt. Masasau, *Dransfield et al.* JD5749 (K, L, SAN, SAR); Beluran, Palau Sapi, *Dransfield et al.* JD5732 (K, SAN, SAR); Sandakan, Kabili–Sepilok F.R., *Enggoh* 7434 (K, SAN); Lahad Datu, Silam F.R. Block 32, *Muin Chai* SAN29718 (K, SAN), Ulu Segama, *Cuadra* 241 (K, SAN); Semporna, Timbun Mata F.R., *Puasa* 7405 (K, SAN).

E KALIMANTAN: Kutei Nature Reserve, Sengata, *Dransfield* JD1523, JD1557, JD1587, JD1618 (all BO).

Common in lowland Dipterocarp forest at altitudes up to c. 500 m.

It is most remarkable that this common and conspicuous north and east Bornean rattan should never have been described; the epithet reflects this. *C. praetermissus* is a member of Furtado's § *Coleospathus* and seems most closely related to *C. radulosus* of Malaya; Sumatran *C. micranthus* B1. is superficially

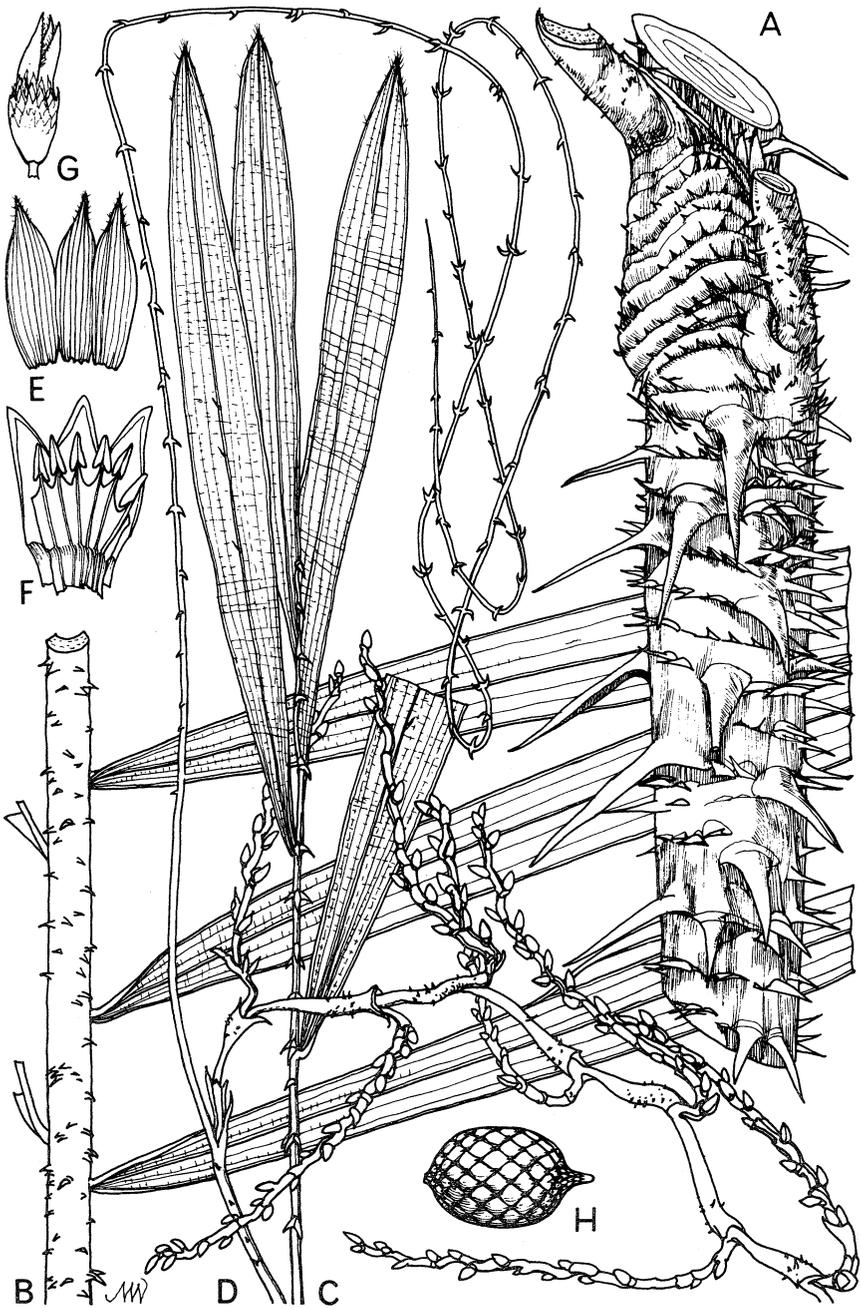


FIG. 7. *Calamus praetermissus*. A leaf sheath with base of flagellum $\times \frac{2}{3}$; B mid-portion of leaf $\times \frac{2}{3}$; C apex of leaf $\times \frac{2}{3}$; D partial inflorescence (pistillate) and inflorescence tip $\times \frac{2}{3}$; E calyx of pistillate flower $\times 6$; F corolla and staminodal ring $\times 6$; G ovary $\times 6$; H fruit $\times 1\frac{1}{2}$. A-C, H from Dransfield JD587, D-G from Pusa 7405. Drawn by Mary Millar Watt.

very similar in the field but is probably not closely related, as the rachillae are much more robust and in structure and armature quite different.

In Sabah, leaflet width seems to be quite variable; though most of the populations have rather broad leaflets, in some they are narrow; leaf sheath armature is also variable particularly between juvenile and adult climbing individuals.

The cane produced by this species is of quite good quality, fitting in the same size class as 'rotan sega' (*Calamus caesius*).

11. ***Calamus malawaliensis*** J. Dransf. sp. nov. ad sectionem *Phyllanthectum* pertinens hic palmijuncus gracillimus *C. microsphaerion* affinis sed vaginis foliorum sparsissime lepidotis, inflorescentia minuta, rachillis brevissimis, fructu squamis convexis nitentibus in ordinibus 13 verticalibus dispositis vice planis impolitibus in ordinibus 17–18 differt. Typus: Borneo, Sabah, *Phillipps & Dewol* SAN 89981 (holotypus SAN).

Very slender rattan with stems climbing to 7 cm; stem without sheaths to 4 mm diam., with sheaths to 7 mm; internodes to 11 cm. Leaf sheaths drying very pale bluish-green, with very sparse fugacious grey scales and armed with abundant short black-tipped spines to 5 mm with conspicuously swollen bases, the bases drying slightly paler than the body of the sheaths. Knee poorly developed, slightly swollen, inconspicuous. Ocrea membranous, unarmed, inconspicuous, to 1 mm. Leaf cirrate to 76 cm including the petiole to 18 cm and cirrus to 18 cm; petiole semi-circular in cross-section c. 3 × 2 mm, sparsely armed with the scattered black-tipped spines with pale bulbous bases; leaflets about 10 on each side of the rachis arranged irregularly in different planes in groups, for example, two followed by three followed by two followed by one followed by one, the groups about 8 cm distant; longest leaflets proximal, to 16 × 1.5 cm; mid-leaf leaflets to 13 × 1.1 cm, apical leaflets to 10 × 0.6 cm; leaflet drying pale bluish-green, unarmed; transverse veinlets short, invisible on abaxial surface, prominent on adaxial surface. Almost mature infructescence, only, known; erect, to 22 cm, unarmed throughout; prophyll to c. 4 cm, closely tubular; other primary bracts three in number, decreasing in size towards the apex of the infructescence; partial inflorescences four, c. 5 cm distant to 5 cm long; rachillae borne on the partial inflorescence, to 1 cm long; rachilla bract tightly sheathing c. 1 mm long with a very short triangular keeled point; involucrophore c. 0.5 mm high, with a mouth c. 1.5 mm wide and two minute points; involucre c. 0.5 mm high with a mouth c. 1.5 mm wide and bearing an oval cushion c. 0.7 × 0.3 mm, with the scar of attachment of the sterile staminate flower. Fruiting calyx tubular in basal 1.2 mm and with three explanate irregularly split sepals to 0.7 × 1.3 mm; corolla with three triangular petals to 2 × 1.2 mm. ± Mature fruit sphaerical, c. 7 mm diam., tipped with a beak to 0.8 × 0.8 mm, and covered in 13 vertical rows of convex, shiny straw-coloured scales with dark brown margins. Seeds two in each fruit (? always), hemisphaerical, c. 4 mm diam.; endosperm homogeneous, embryo on the flat face. Seedling leaf unknown.

SABAH. Kudat District, Malawali Is., *Phillipps & Dewol* SAN89981 (holotype SAN), and SAN89969 (SAN).

This extraordinarily slender rattan seems most closely related to *C. microsphaerion* Becc. It differs in the very small inflorescence with very short rachil-