

spikelets; the apical parts of the long primary branches as well as all short primary branches subdivided into simple, filiform, 4-6 cm. long spikelets. *Primary spathes* long, tubular, aculeate, the striate, longer ones practically unarmed, the others scabridulous; tertiary striate, tubular, scabridulous; male flowers alternate, remote, bifarious, dark. *Female spadix* and fruits unknown.

MALAYA: Singapore, Woodlands (Ridley 12,607, isoholotype).

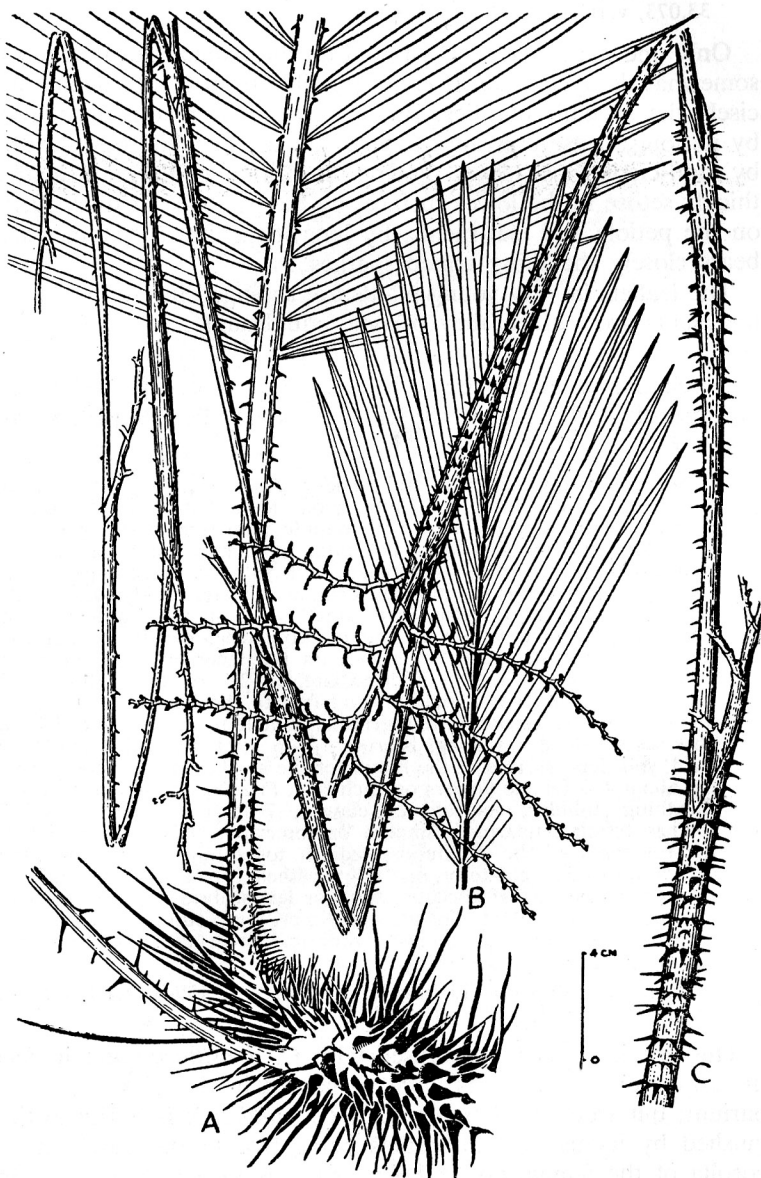
Among the Malayan species *C. scabridulus* comes very near to *C. laxiflorus*, but the former has very remote, inequidistant broader leaflets, and very scabrid spathes, and spathels. *C. luridus*, which also comes close to this, has inequidistant and broader leaflets, and almost unarmed spathes and spathels.

The holotype is in Beccari's Herbarium in Florence.

66. *Calamus balingensis* Furtado sp. nov.—t. 66.

Caudex solitarius, 8-12 m. longus, cum vaginis circa 2 cm. in diam. *Vagina* frondis flagellifera, infra petiolum gibbosa, aculeis inaequalibus, laminaribus, horizontalibus vel ascendentibus, apice longissime subuliformibus, solitariis, 2-5 cm. longis, apicalibus ad 10 cm. longis porrectis densissime horrida, apice oblique truncata. *Ocrea* brevis, inermis, mox decidua. *Fronde*s haud cirriferæ, in foliola plurrima æquidistantia ensiformia divisæ, 1.60-2 m. longæ, in rachide, petioleque dense furfuraceæ; petiolus circa 15-25 cm. longus, supra applanatus secus margines aculeolis per series 2-3 dispositis confluentibus ornatus, subtus convexus, basin versus omnino aculeolatus; lamina circa 1.40-1.75 m. longa, in rachidis dorso unguibus per series 3 dispositis, solitariis vel basi confluentibus prædita. *Foliola* æquidistantia, ensiformia, 22-28 cm. longa, 14-16 mm. lata, tricostata, circa 1.5 cm. inter se dissita, duo apicalia minima libera, omnia superne in costis marginibusque setosa, subtus in costis primariis alterisque setulosissima, apice acuminatissima vel acuta, setosa. *Spadix masculus* flagelliformis, frondibus paulo longior, in inflorescentia partiales circa 6, maximas circa 20 cm. longas, divisus; inflorescentiæ partiales porrectæ, in ramos secundarios spiculiferentes divisæ. *Spathæ primariæ* tubulosæ, basali obscure bicarinata magis horrida excepta, cylindricæ, valde aculeolatæ, aculeis interdum seriatim despositis, apice scariousæ vel marcescentes; spathæ secundariæ elongato infundibuliformes, circa 2 cm. longæ, inermes, deciduo furfuraceæ; spathæ tertiariæ minores, conformes deciduo furfuraceæ. *Spiculæ* marcidæ, diruptæ tantum visæ, circa 2 cm. vel plus longæ ut videtur; spathellæ infundibuliformes, in ligulam erectam terminatæ. *Involucrum* cupuliforme haud exsertum. *Alteræ partes* et spadices feminei ignoti.

Stem solitary, 8-12 m. long, with sheaths about 2 cm. in diam. *Leaf-sheaths* flagelliferous, gibbous below the petiole, densely armed with solitary, unequal, 2-5 cm. long, ascendent or horizontal spines; those at the mouth longer and much more slender, up to 10 cm. long. *Leaves* non-cirriferous, densely furfuraceous, 1.60-2 m. long, including the 15-25 cm. long petiole; the latter armed on the dorsal side and along the margins more densely at the base; rachis armed below with solitary or confluent claws arranged in three series. *Leaflets* numerous, closely set, ensiform, largest 22-28 cm. long, 14-16 mm. broad, setose along the nerves on both sides; the two terminal leaflets free, and like the basal ones, among the smallest. *Male spadix* slightly longer than the leaves, clawed in the axis, not provided with a long clawed appendix, divided in about 6 branches, the longest of which being about 20 cm. long. *Spathes*: primary tubular, densely aculeolate, especially the basal one; secondary spathes unarmed, furfuraceous, about 2 cm. long. *Spikelets* apparently about 2 cm. or more long.



Tab. 66. *Calamus balingensis* (Furtado 33,073—holotypus).

A, Frondis fragmentum cum petiolo et parte vaginae. B, Frondis fragmentum apicale. C, Spadix masculus.

MALAYA: Kedah, Gunong Baling, prope Gua Bebu (Furtado 33,073, vern. nom. *Rotan Tanah*).

Only one male spadix was found on the plants, and that too in somewhat decayed state. It is not possible from this to define precisely the specific affinities. But the species is readily recognised by its long, densely arranged spines on the flagelliferous sheaths, by non-cirriforous leaves having ensiform, equidistant leaflets thickly setose in the lower surface, by the presence of thick furfur on the petiole and leaf-rachis, by long, flagelliform spadix which bears closely sheathing armed spathes.

The leaflets in very young plants are arranged in groups, but as the plants grow older, they become equidistant.

67. *Calamus pulaiensis* Becc. in Ann. Roy. Bot. Gard. Calc. XI Appendix (1913) 34 t. 18; Ridl., Fl. Malay Pen. V (1925) 56.
—t. 67.

Stem probably scandent and slender. *Leaf-sheaths* gibbous above; petiole 14–20 cm. long, 8–10 mm. broad at its base, provided on the dorsal side towards the base with minute numerous pustular growths and along the margins with 1–4 mm. long, horizontal spines, 8–15 mm. apart; rachis armed underneath with solitary, black-tipped claws. *Leaflets* obscurely 3-costulate, ensiform, acuminate, equidistant, closely-set, 1.5–2 cm. apart, armed with small setae on the 3-costae of the upper surface, and with very minute, somewhat deciduous, hairs on the principal costae, and sometimes on the secondary, on the lower surface; the largest leaflets intermediate, 16–24 cm. long, 10–12 mm. broad; the terminal two smallest and free to the base. *Female spadix* about 1 m. long including the terminal flagellum, divided into 4 branches, each 14–18 cm. long, bearing 12–16 alternate, 2.5–4 cm. long, rigid, spikelets inserted at the mouth of the spathes; each spikelet bearing about 4–9 female flowers on each side. *Primary spathes* very closely sheathing, tubular, aculeate or clawed, 7–15 cm. long; secondary spathes tubular, unarmed, smooth or somewhat striate, covered with the remnants of the deciduous, reddish tomentum, 10–12 cm. long, truncate, shortly ligulate on one side; spathels broadly infundibuliform, somewhat veined, furfuraceous, more or less scabrid, ligulate. *Involucrophore* cupular; female flowers 4–4.5 mm. long; corolla twice as long as the calyx, the latter almost cylindrical, with the base somewhat callous. *Male spadix* not known.

MALAYA: Johore, Gunong Pulai (Ridley 12,199-isoholotype? and s.n. in Dec. 1904, as to the spadix).

This species is easily confused with *C. densiflorus* and in fact the above cited specimens were so named in the Singapore herbarium; but from the latter species *C. pulaiensis* is easily distinguished by its two apical leaflets being free to the base, and a corolla of the female flower being twice as long as the calyx. In this last rare character it resembles *C. luridus*, a species which acquires a dark brown colour in the herbarium specimens. Both *C. luridus* and *C. densiflorus* have broader and more distant leaflets without minute hairs on the costae underneath. Some species