

A new species of *Calamus* (Arecaceae: Calamoideae) from north-east Thailand

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Summary. *Calamus temii* T. Evans from Phu Luang Wildlife Sanctuary, north-east Thailand is described as a new species. It is distinctive in its combination of arborescent habit, grouped, concolorous leaflets less than 40 cm long, laminar, black rachis spines, strongly tattering primary and secondary inflorescence bracts (unusual in the genus), short, stout, appressed female rachillae and dark, almost globose fruits with a ruminant endosperm. It seems most similar to the poorly known Chinese species *C. melanochrous* Burret.

INTRODUCTION

During work on a revision of the rattans of the Lao PDR (Laos) and neighbouring areas, material of an unusual arborescent species of *Calamus* was found at BKF. It had been determined as *Calamus* cf. *C. arborescens* Griff., to which it bears a general resemblance. However, a study of the literature and material at BK, BKF, KUN, HITBC and K (including extensive loans from the other herbaria listed in the Acknowledgements) shows that it differs significantly from this and all other arborescent rattans in the region.

All specimens listed have been seen by the author.

DESCRIPTION OF THE NEW SPECIES

***Calamus temii* T. Evans sp. nov.**; a *C. melanochroo* Burret habitu arborescenti, endospermio ruminato differt; a *C. oxycarpo* Becc. et *C. macrorhyncho* Burret foliolis concoloribus indumento infra carenti, fructibus vix globosis et endospermio ruminato distinguenda. Typus: Thailand, Loei Province *Tem Smitinand* s.n. (holotypus K; isotypus BKF).

Moderately robust, erect rattan up to 5 m tall. Distal part of leaf sheath brown when dry, tapering gradually into the petiole and bearing partial whorls of laminar, elastic black spines up to 3 cm long, the spine bases thickened, neatly defined from the blades and drying brown like the sheath. Amongst the larger spines many smaller, needle-like or laminar, black spines, mostly in groups. Entire leaf not seen, but large (perhaps 1.5 – 2 m long in total), ecirrate. Entire petiole not seen, probably greatly exceeding 50 cm, about 1 – 1.2 cm in diameter, rounded abaxially and deeply channelled adaxially, armed on both surfaces with

Accepted for publication September 2001.

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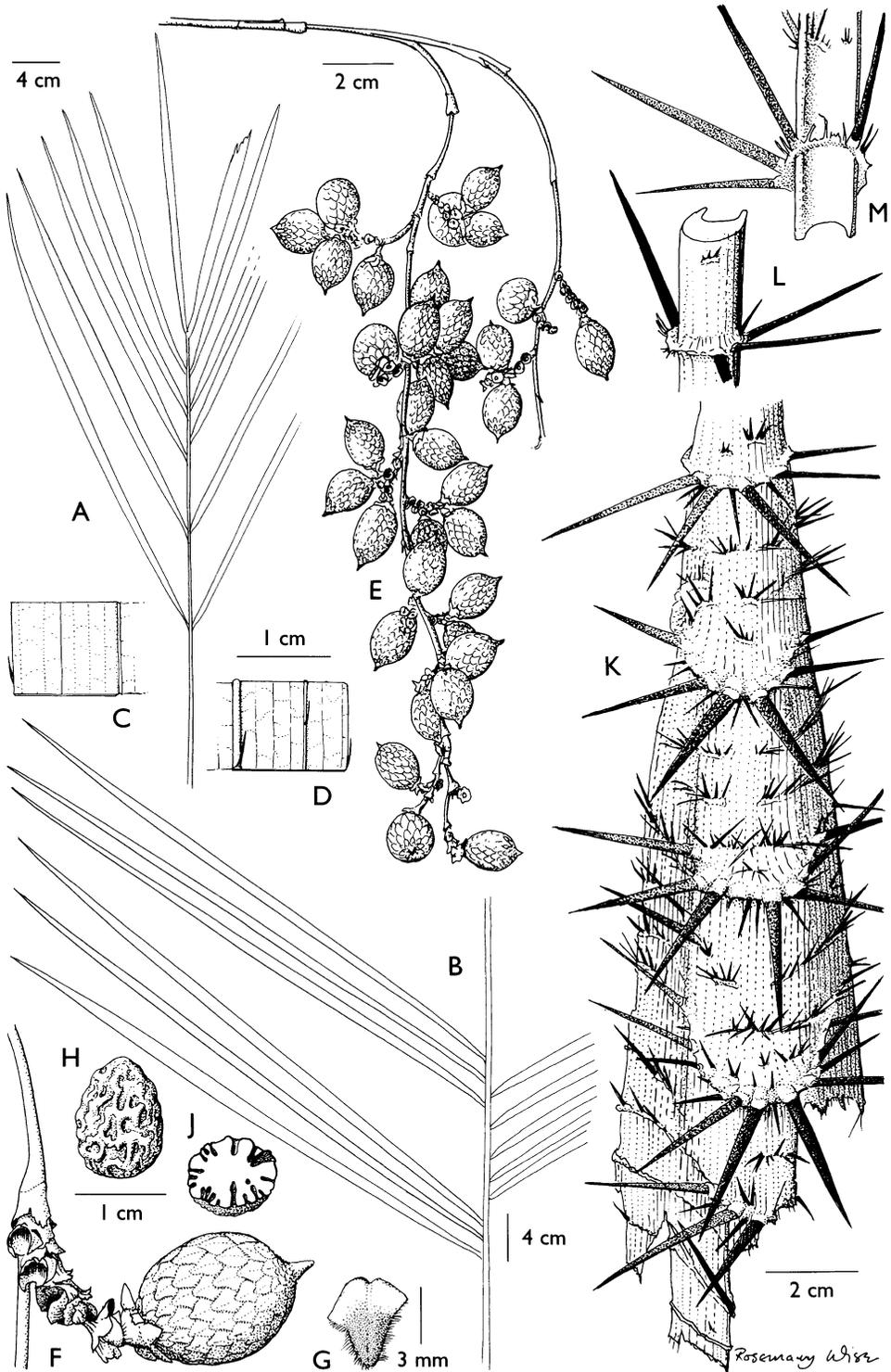
widely spaced, more or less complete whorls of large and small spines like those of the upper sheath. Rachis rounded abaxially, acutely bifaced adaxially, armed on all surfaces with incomplete whorls of laminar, black spines up to 2.5 cm proximally, much shorter distally. Leaflets arranged in groups of 2–6, more in the terminal group, lying in a single plane, angled away from the stem and not divaricate, ensiform or narrowly lanceolate, up to 40 × 2 cm, terminal pair not joined, drying light green adaxially and a paler grey-green abaxially but wholly lacking pale indumentum, adaxially bearing three lines of black bristles along the three prominent costae, abaxially with 1–3 sub-prominent veins, all without bristles. Male inflorescence unknown. Female inflorescence not seen entire, apparently more or less erect at base, drooping distally, more than 80 cm long, branched to two orders, partial inflorescences up to 40 cm long in the terminal part of the inflorescence, primary branches quite slender, primary and secondary bracts heavily tattered almost to the base, much of each bract eventually deciduous, degree of armature not clear in available material, the bract bases marked by pronounced dark rings at the point of attachment, rachillae arising at the base of their subtending bracts, stout in relation to the primary branches, appressed at the base, 1–2 (rarely 3) cm long, with flowers at 4 mm intervals on each side and thus appearing crowded, the axis very slender but rarely visible, rachilla bracts short and very broadly funnel-shaped, about 8 mm wide with a long apiculate limb on one side, involucre arising half inside the mouth of the rachilla bract, deeply cupular, involucre also deeply cupular but strongly asymmetrical, raised to a prominent exposed crest on the side bearing the impression of the neuter flower, broadly and deeply notched and lower than the rim of the involucre on the other side. Site of the neuter flower about $\frac{1}{4}$ as large as the site of the female flower. Flowers not seen. Fruiting perianth explanate, split almost to the base but the basal part of each lobe thickened and the distal part slightly reflexed, giving the impression of a weakly pedicelliform perianth. Fruit, very broadly ellipsoid, almost globose with a short, abrupt beak, 19 × 14–15 mm, very dark, the scales blackish, becoming deep chestnut brown basally and bearing a mid-brown fimbriate margin, sometimes lightly channelled. Concealed part of scale base bright yellow, only visible when fruit is broken open. Seed ellipsoid, 11 × 10 × 8 mm, flattened on the side bearing the deep chalazal fovea, the surface deeply pitted and channelled, shape and pattern together resembling a human brain. Albumen strongly ruminant. Embryo basal. Fig. 1.

SPECIMENS EXAMINED. THAILAND (NORTH-EAST): Loei Province, Phu Luang, (fr.), Feb. 1991, *T. Smitinand* s.n. (K, BKF); same province, Wang Sapluang Distr., Phu Luang Wildlife Sanctuary, Lou Tae, (fr.), 15 May 1998, *Wongprasert* s.n. (BKF); same district and sanctuary, Phu Yong Phu, (fr.), 16 May 1998, *Wongprasert* s.n. (BKF).

HABITAT. In lower montane oak forest at 1300–1550 m.

FRUITING. Fruits apparently almost ripe in February and May.

FIG. 1. *Calamus temii* **A** leaf tip; **B** leaf (middle section); **C** leaflet (abaxial face); **D** leaflet (adaxial face); **E** inflorescence (terminal part); **F** rachilla and fruit; **G** fruit scale; **H** seed surface; **J** seed in transverse section; **K** distal part of leaf sheath and proximal part of petiole; **L** distal part of petiole (abaxial face); **M** distal part of petiole (adaxial face). From *T. Smitinand* s.n. Drawn by Rosemary Wise.



NOTES. *Calamus temii* seems to be close to *C. melanochrous* Burret from Guangxi in China, although the latter is known only from the brief protologue and the isotype in A (a single fruit and tiny piece of leaflet, together with a photograph of the holotype, from B, which is itself now believed destroyed). The *Flora of China* account is based solely on the protologue (Pei *et al.* 1991) and there is no published mention of any herbarium material of this species in China. Wei (1986) considered *C. melanochrous* a doubtful species, probably referable to *C. thysanolepis* Hance, but I agree with Pei *et al.* (1991) that the two are distinct.

Burret stated that *C. melanochrous* was a climber (based on the collector's notes 'creeping...on trees in a wood') and had a homogeneous endosperm. The seed interior cannot now be re-examined since only one fruit remains, so we must assume Burret noted this accurately. Another apparently related species, *C. macrorhynchus* Burret, also from China is noted as 'semi-erect to climbing' by Pei *et al.* (1991). This is an unusual character state amongst Calamoid palms, which can usually be clearly ascribed to acaulescent, arborescent or climbing types (J. Dransfield pers. comm. 2001). There is a possibility that either *C. temii* or *C. melanochrous* will also prove to show this rare, ambiguous habit given further fieldwork, in which case a reassessment of their distinctness might be appropriate.

Five other arborescent *Calamus* species occur in or near Thailand and are perhaps more likely to be confused with *C. temii* by field botanists than are the three Chinese species diagnosed above. All have persistent primary inflorescence bracts with a long tubular base, lacerate to varying degrees in the distal part, and they also show the following individual differences from *C. temii*. *C. erectus* Roxb. (northern Indochina west to India) differs in its whorls of long, yellow petiole spines, leaflets usually longer than 60 cm, stiffly erect inflorescences, and larger and more strongly patterned ovoid fruit up to 3 cm long. *C. arborescens* Griff. (south-west Thailand and areas to the south and west) differs in its larger, ungrouped leaflets with prominent white indumentum below, much longer and thicker female rachillae, and fruits with deeply channelled scales and homogeneous endosperm. *C. dongnaiensis* Pierre ex. Becc. (south Vietnam) has paler rachis spines, larger and less bristly leaflets, and, in the male, a longer, flagelliform inflorescence with spiny primary bracts. *C. harmandii* Pierre ex. Becc. (south Laos) has different armature, regularly spaced leaflets and a very slender inflorescence with remote, almost spicate partial inflorescences and unusual, crowded, densely tomentose rachillae bearing flowers in apparently jumbled spirals. Finally, *Calamus modestus* T. Evans & T. P. Anh (central Vietnam) has leaflets up to 24 × 1 cm, short, stiffly erect inflorescences and small, ovoid fruits.

The female plant of *C. dongnaiensis* is unknown but its inflorescence seems most likely to resemble the male inflorescence which is slender, flagelliform and over 170 cm long with quite slender, lax rachillae over 10 cm long. There is, however, a slim possibility that it resembles the shorter, much more robust female inflorescence of *C. temii*. Differences in many details of the leaflets, spines and inflorescence bracts suggest that *C. dongnaiensis* will remain abundantly distinct from *C. temii* when better known.

C. temii may also occur at high altitudes elsewhere in the Petchabun range and in nearby areas of northern Thailand and northern Laos.

There is no widely applicable sub-generic classification of the genus *Calamus*. Various formal or informal systems have been proposed by Beccari (1908), Furtado (1956, focussing on the Malayan species) and Wei (1986, for the Chinese species). However, ongoing modern cladistic analyses indicate that many features used by these authors, such as habit and climbing organ, are poor guides to monophyly in this subtribe (Baker *et al.* 2000).

Calamus temii does not fit satisfactorily in any of the existing systems. In particular, the primary inflorescence bracts of *C. temii* are unusual in the genus since in the infructescences seen they have been almost entirely lost, leaving only a dry and tattered basal portion 0.5 – 2 cm long which is split almost to the base. Based on the limited material available this feature also appears to be shared by *C. melanochrous*, *C. macrorhynchus* and a third Chinese species, *C. oxycarpus*, suggesting that these four species may have close affinities. They are unusual since in most congeners the primary bracts remain mostly tubular, entire and living, sometimes splitting or becoming partially lacerate (Uhl & Dransfield 1987).

Beccari (1913) believed that *C. oxycarpus* lay close to *C. arborescens* (informal grouping II of Beccari 1908) amongst the species he recognised and Wei (1986) places both *C. oxycarpus* and *C. macrorhynchus* in subgenus *Protocalamus* C. F. Wei, alongside *C. thysanolepis* Hance, *C. dianbaiensis* C. F. Wei, *C. yuangchunensis* C. F. Wei and *C. guangxiensis* C. F. Wei. However, because of their distinctive primary inflorescence bracts and a combination of other details *C. temii* and the three similar species mentioned above are perhaps better left in an unassigned position, pending a better subgeneric classification. This group of four poorly known species probably merits careful attention during the construction of such a system.

ACKNOWLEDGEMENTS

The work on Lao rattans was funded by the Department of the Environment of the UK government through the Darwin Initiative for the Survival of Species as a part of the project 'Diversity and sustainable use of rattans in Lao PDR'. Work in Laos was conducted in cooperation with the Forestry Research Centre of the National Agriculture and Forestry Research Institute.

I would like to thank my Lao colleagues, Khamphone Sengdala, Oulathong V. Viengkham and Banxa Thammavong for their collaboration in the project, John Dransfield and Nick Brown for supervising the work and Kongkanda Chayamarit for permission to visit BKF and the donation of a duplicate to K. The following herbaria provided loans or information: A, AAU, BH, HITBC, IBK, IBSC, KUN, LE, MO, S and PE. John Dransfield kindly supplied the Latin translation of the diagnosis and Rosemary Wise drew the illustration.

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