

## Four new species of *Calamus* (Arecaceae: Calamoideae) from Laos and Thailand

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*Summary.* *Calamus laoensis*, *C. solitarius*, *C. pauciflorus* and *C. bimaniferus* are described from Laos and nearby parts of Northeast Thailand.

### INTRODUCTION

As part of a project to produce a field guide to the rattans of the Lao People's Democratic Republic (hereafter 'Laos') extensive new field collections were made and a taxonomic revision has been carried out. The limited pre-existing Lao material and extensive material from neighbouring areas were also examined in K, P, BK, BKF, KUN and HITBC. A detailed synopsis of the Lao rattan flora will be published in due course. This paper contains descriptions of four new taxa discovered requiring validation before the publication of a field guide (Evans *et al.* in prep.). Two of these, *C. solitarius* and *C. pauciflorus*, are superficially similar to one another, to *C. tetradactylus* Hance and to *C. cambojensis* Becc.; a full discussion of variation in this complex group will be included in the synopsis. In this paper FRCL is used to indicate the rattan herbarium of the Forestry Research Centre, Laos. The long term status of this collection is not clear; duplicates of most numbers including all types cited here have already been lodged at K and it is hoped to exchange others with active herbaria in the region. In the lists of Lao material cited the geographical order is approximately Northwest to Southeast. Place names are those in local use; significant differences in the names used on Lao Service Geographique National 1:100 000 topographic maps are noted. Local names and information on uses were noted at the time of collecting from discussions with guides, generally hired from the nearest village.

**1. *Calamus laoensis*** T. Evans, K. Sengdala, O. V. Viengkham, B. Thammavong & J. Dransf. **sp. nov.**, a *C. flagello* Griff., *C. karinensi* S. J. Pei & S. Y. Chen et *C. rudento* Lour. affinis sed foliolis conspicue discoloribus, arcte aggregatis plumosis setulis carentibus differt; a *C. rudento* fructibus elongatis majoribus recedit; a *C. flagello* et *C. karinense* vaginis foliorum auriculis carentibus et rachillis gracilioribus et

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endospermio homoganeo differt; a *C. longiseto* Griff. paginis foliolorum setis longis carentibus foliolis discoloribus, fructibus pyriformibus abrupte rostratis, squamis profunde porcatis et rachillis gracilioribus differt. Typus: Laos, *Khamphone Sengdala* 206 (holotypus K, isotypus FRCL).

Robust, climbing, clustering, flagellate rattan reaching at least 40 m long. Stem without sheath 20 – 25 mm diam., with sheath 35 – 50 mm. Leaf ecirrate, total length 1.7 – 2.5 m, sheath light grey-green or pale yellow-green in life, bearing numerous larger laminar spines up to 6 cm long, pale straw- or copper-coloured at base merging into a dark tip and numerous smaller, acicular, black spines, indumentum dark, persistent amongst the spines, ocrea forming a brittle margin to the sheath mouth about 1 cm tall, armed as the sheath, rapidly disintegrating; knee present but indistinct, petiole on upper leaves 5 – 10 cm long, up to 40 cm on some apparently mature middle leaves and longest in basal leaves, petiole deeply grooved adaxially, rounded abaxially, armed on both surfaces with many laminar spines like the sheath, rachis becoming acutely bifaced distally, armed abaxially with partial whorls of laminar spines coloured as on the sheath; leaflets lanceolate or, on upper leaves, ensiform, 35 – 65 × 3.2 – 4 cm, up to 50 per side in upper leaves, strongly grouped 2 – 5 at a time on each side of the rachis, moderately plumose, strongly divaricate on juvenile leaves, less so on upper leaves, strongly discoloured with grey-white indumentum abaxially which, in the oldest leaflets, eventually wears off leaving traces close to the point of attachment, central costa prominent and naked on both surfaces, leaflet margins bristly, transverse veinlets many, sinuous, often interrupted. Male inflorescences flagelliform, branched to 3 – 4 orders, up to at least 6 m long excluding a long terminal flagellum, pendulous in all parts; primary bracts coarsely lacerate at the mouth, with many half-whorls of strong claws towards the base and more scattered smaller claws towards the mouth; partial inflorescences deeply inserted in the mouth of the primary bract, up to 120 cm long; secondary bracts unarmed, very tightly sheathing at the base, slightly inflated above half way, the terminal part neatly delineated, strongly tattering, dying early; tertiary branches deeply inserted in secondary bracts, tertiary bracts also tightly sheathing at base, slightly inflated distally, mouth entire, without a distal part dying early, oblique with a short, pointed limb; rachillae inserted in the axils of the tertiary bracts, often over 15 cm and sometimes up to 30 cm long, slender (rachilla bracts up to 4 mm wide at mouth), involucre deeply inserted within rachilla bract, flowers at 3 mm intervals, not seen mature. Female inflorescences not seen entire; rachillae to at least 25 cm long, moderately robust (mouth of rachilla bract up to 6 mm wide), flowers at 6 mm intervals, involucre inserted near the mouth of the rachilla bract. Fruiting perianth explanate. Fruit broadly ovoid, slightly wider above mid point than below, abruptly short-beaked, length with beak 20 mm, 12 mm diam., epicarp scales in 12 vertical rows, deeply channelled, drying rich rusty orange with narrow dark submarginal band and narrower cream margin which is slightly erose; seed homogeneous. Fig. 1.

DISTRIBUTION AND HABITAT. Laos, in Xayaboury, Vientiane and Bolikhamxay Provinces in evergreen forest, including sites at the foot of karst limestone, at 220 – 360 m.

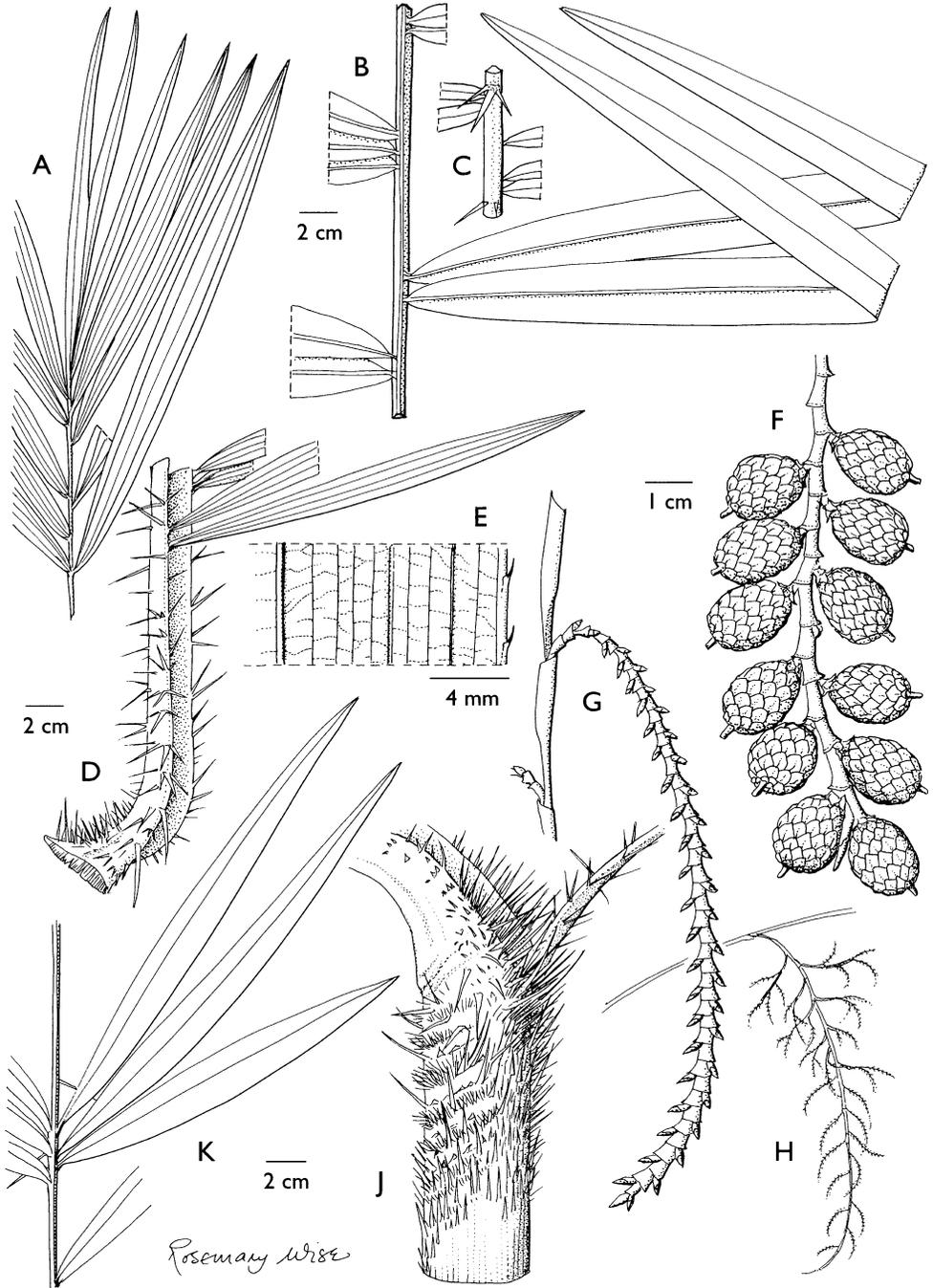


FIG. 1. *Calamus laoensis*. A mature leaf tip; B mature leaf (middle part, adaxial surface); C mature leaf (middle part, abaxial surface); D mature leaf petiole; E leaflet surface; F fruiting rachilla; G male rachilla; H habit of partial inflorescence; J sheath; K juvenile leaf (middle part). A – H from *Khamphone Sengdala* 206; J – K from *Khamphone Sengdala* 352. Drawn by Rosemary Wise.

LOCAL NAMES. *wai keyomee, wai leum, wai wa* and *wai katok*.

SPECIMENS EXAMINED. LAOS. Xayaboury Province, exact locality unknown, undated, ster. *Khamphone Sengdala* 103 (FRCL, K); Ban Na Oum, near Houay Deua, Phieng Distr., Xayaboury Province, 18°38'28" 101°31'13", 5 June 1999, stam. *Oulathong V. Viengkham* 224 (FRCL, K); Cemetery forest near Ban Meuang, Feuang Distr., Vientiane Province, 18°43'14" 102°07'57", 11 May 1998, stam. & fr. *Khamphone Sengdala* 206 (isotype FRCL, holotype K); Ban Naphong, Pakkading Distr., Bolikhamxay Province, 11 Dec. 1992, ster. *Sounthone Ketphanh* 26 (FRCL, K); Pha Noy, near Ban Naphong, Pakkading Distr., Bolikhamxay Province, 18°08'29" 104°23'29", 4 Feb. 1999, stam. *Khamphone Sengdala* 352 (FRCL, K); foot of Tat Thone waterfall, Ban Naphong, Pakkading Distr., Bolikhamxay Province, 18°11'50" 104°23'00", 11 Jan. 1999, ster. *T. Evans* 15 (FRCL).

NOTES. The conservation status of the species is unknown. The site in Vientiane Province supports a number of individuals in a sacred forest patch where they are protected from cutting by local taboos; this is why the holotype includes no stem or sheath. The stems are believed to be of at least moderate commercial potential. The name 'laoensis' is preferred to 'laosensis' because the name 'Lao' is generally preferred today for official purposes within the country. Lao is pronounced as 'cow', not 'layo'.

**2. *Calamus solitarius*** *T. Evans, K. Sengdala, O. V. Viengkham, B. Thammavong & J. Dransf. sp. nov.* *C. tetradactylo* Hance, *C. cambojensis* Becc. et *C. paucifloro* T. Evans et al. affinis sed habitu solitario, altescendenti inflorescentiis partialibus multolongioribus differt. Typus: Laos, *Oulathong V. Viengkham* 240 (holotypus K, isotypus FRCL).

Slender, solitary, climbing, flagellate rattan often over 30 m, reportedly sometimes exceeding 100 m. Rarely fertile when less than 15 m long. Stem without sheath 4 – 10 mm diam., with sheath 6 – 15 mm, the larger stems usually those in bright sunlight. Leaf ecirrate, 0.5 – 1 m long, sheath light or dark green with scattered dark or light indumentum, spines numerous to few or sometimes almost absent (especially on sheaths in deep shade), solitary, scattered, acicular with very slightly swollen base, green, of various sizes up to 20 mm long, more or less horizontal, ocrea tiny, unarmed, marcescent; knee prominent, petiole of upper leaves 2 – 10 cm long, abaxially rounded and armed with scattered spines with slightly swollen bases, adaxially flat and unarmed or with scattered prickles, rachis adaxially unarmed, becoming acutely bifaced distally, rounded abaxially and armed with scattered dark-tipped claws; leaflets lanceolate, up to 32 × 4.5 cm (on some plants no larger than 15 × 3.5 cm), 9 – 14 per side, strongly grouped in pairs (or rarely 3s), the pairs usually opposite one another, basal leaflet on each side sometimes solitary, terminal leaflets in a group of four, the inner pair joined for 20 – 60% of their length, adaxial midrib and two other costae prominent, two other costae sometimes sub-prominent, usually naked but the central one occasionally with a few bristles distally, abaxially one or no costae prominent, several others sub-prominent, all naked, leaflet margins naked or rarely with a few scattered bristles, transverse veinlets quite conspicuous, sinuous, moderately