

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., Bolikhamsay Province, 11 Dec. 1992, ster. *Sounthone Ketphanh* 26 (FRCL, K); Pha Noy, near Ban Naphong, Pakkading Distr., Bolikhamsay 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., Bolikhamsay 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, altescendantis 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

interrupted. Inflorescences slender, flagelliform, 1.3 – 5.0 m long excluding terminal flagellum, pendulous, those on stems flowering for the first time usually short with short partial inflorescences; those on more mature stems much larger in all their parts. Male inflorescences with primary bracts tightly sheathing, armed with scattered claws, entire at the mouth with a short acute limb; partial inflorescences long, basal one (40) 60 – 100 (135) cm, inserted deep within the primary bracts or exserted by several centimetres; secondary bracts unarmed, long and tightly sheathing, ending in a short acute limb; secondary branches borne at the mouth of the secondary bract or well outside, occasionally exceeding 20 cm long, tertiary bracts unarmed, tightly sheathing with a slight apiculate limb; rachillae slightly exserted, slender, up to 4 cm long, with many very small rachilla bracts at 1.5 mm intervals. Female inflorescences similar in size and appearance of primary and secondary bracts; rachillae slightly exserted from secondary bracts, up to 4 cm long (rarely to 12 cm), much stouter than male, often strongly recurved, even arching back across the branch; rachilla bracts tightly sheathing, at 3.5 mm intervals, with an acute limb bent back by the involucrophore; involucre facing out at an obtuse angle to the rachilla, subdiscoid and sometimes slightly pedicellate, placed just above the mouth of the rachilla bract, fruiting perianth strongly pedicellate. Fruit only seen immature, when spherical with an abrupt beak, the scales green with red-brown scale margins. Fig. 2.

**DISTRIBUTION AND HABITAT.** Laos, in Bolikhamxay and Khammouane Provinces in evergreen or semi-evergreen forest, including areas with much bamboo, at 200 – 580 m and (historically) Thailand in Nong Khai Province at 200 m. We have also seen a specimen of this species collected by J. F. Maxwell in Feuang Distr., Vientiane Province but have yet to make a detailed comparative examination.

**LOCAL NAMES.** *wai thork* (=*wai tork*), *wai yong*, *wai hak yong* and *wai savang*, the first name in both Thailand and Laos.

**SPECIMENS EXAMINED.** LAOS. Near Tat Say waterfall, Ban Hatkhai, Thaphabaat Distr., Bolikhamxay Province, 18°27'15" 103°09'00", 10 April 1998, ster. *Khamphone Sengdala* 137 (FRCL, K); headwaters of Houay Say, Thaphabaat Distr., Bolikhamxay Province, 18°29'12" 103°06'56", 16 Dec. 1998, stam. *Khamphone Sengdala* 312, pist. *Khamphone Sengdala* 313, stam. *Khamphone Sengdala* 316, fr. *Khamphone Sengdala* 317 (all FRCL, K); E of Ban Vangkor, Khamkeut Distr., Bolikhamxay Province, 18°09'20", 105°04'30", 15 March 1999, stam. *Khamphone Sengdala* 390 (FRCL, K). Houay Basong, near mouth of Houay Nyanyoung [not Nanyoung as stated on label], Ban Naphong, Pakkading Distr., Bolikhamxay Province, 18°18'10" 104°23'40", 6 April 1999, pist. T. Evans 45 (FRCL, K); headwaters of Houay Sair, Ban Naphong, Pakkading Distr., Bolikhamxay Province, 18°07'50" 104°23'30", 11 May 2000, fr. *Oulathong V. Viengkham* 240 (isotype FRCL, holotype K); Phou Tamor, Ban Laokha, Hinboun Distr., Khammouan Province, 17°54'12" 104°24'46", 27 Aug. 1999, stam. *Khamphone Sengdala* 445, stam. *Khamphone Sengdala* 446, ster. *Khamphone Sengdala* 447 (all FRCL, K). THAILAND. Chaiyaburi, Nong Khai Province, 21 Feb. 1924, fr. A. Kerr 8534 (K, BK).

**NOTES.** This species is usually easily distinguished in life from *C. tetradactylus* Hance, *C. cambojensis* Becc. and *C. pauciflorus* T. Evans *et al.* by its high-climbing,

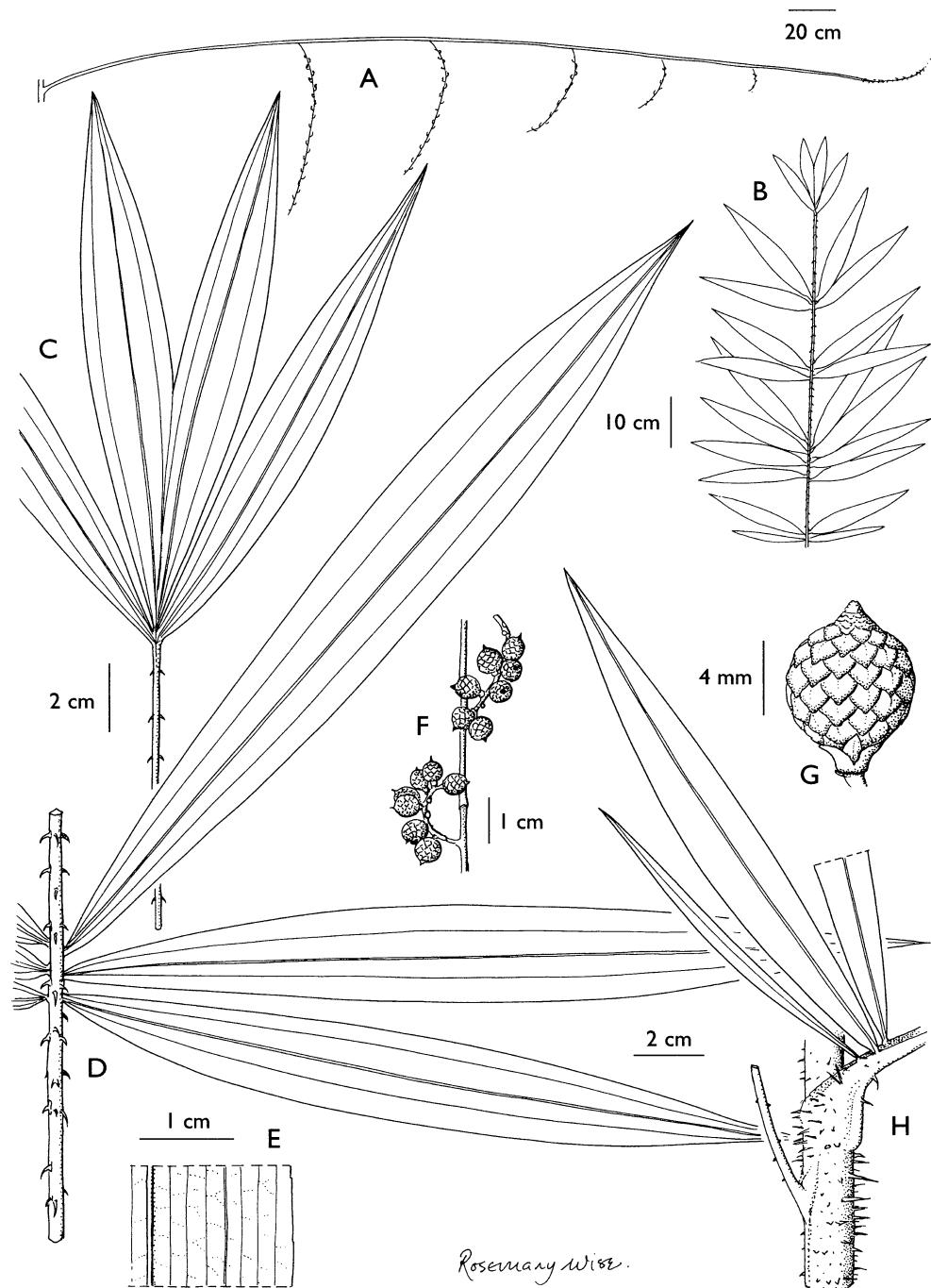


FIG. 2. *Calamus solitarius*. A female inflorescence habit; B leaf; C leaf tip; D leaf (middle part); E leaflet surface; F fruiting rachillae; G immature fruit; H sheath and petiole. All drawn from Khamphone Sengdala 317 by Rosemary Wise.

solitary habit. Herbarium material without this information can be more difficult, especially if the reduced terminal partial inflorescences or inflorescences from young stems have been collected.

In Pakkading Distr., Bolikhhamxay Province, *C. solitarius* is widely sympatric with a plant we consider to be *Calamus tetradactylus* Hance (specimens *Oulathong V. Viengkham* 207, 208 and 209 in FRCL and K). At this site they are easily separated on the basis of consistent differences in the leaves and leaflets, even when habit and inflorescences are not seen. This lends support to the conclusion that these are two distinct taxa.

*Calamus solitarius* is one of the premier quality small-diameter canes in Laos but its solitary habit precludes resprouting and it is likely to be vulnerable to over-harvesting.

Houay Say, cited in the localities above, is wrongly marked on the standard 1:100 000 maps of Laos as H. Kay.

**3. *Calamus pauciflorus* T. Evans, K. Sengdala, O. V. Viengkham, B. Thammavong & J. Dransf. sp. nov.** a *C. tetradactylo*, *C. cambojense* et *C. solitario* inflorescentiis debilibus, feminieis in 1 ordines masculis in 2 ordines ramificantibus, inflorescentiis partialibus longissimis 11 cm nonexcedentibus recedit; a *C. dioico* Lour. (*sensu* Beccari 1908) ocrea nuda, paginis foliorum inermibus et foliolis apicalibus partim connatis, inflorescentia feminea in 1 ordines ramicanti differt. Typus: Laos, *Khamphone Sengdala* 324 (holotypus K, isotypus FRCL).

Slender, climbing, clustering, flagellate rattan reaching at least 7 m long, often flowering when less than 2 m long. Stem without sheath up to 5 mm diam., with sheath 5 – 10 mm. Leaf ecirrate, 0.4 – 0.6 m long, sheath green in life, weakly or moderately armed with yellow-brown, horizontal or slightly ascending, acicular spines 2 – 7 mm long with very slightly swollen bases, ocrea very small, unarmed, marcescent; knee present, clearly defined, petiole of upper leaves 5 cm, channelled adaxially, rounded abaxially, unarmed or armed with a few spines abaxially, rachis adaxially acutely bifaced and unarmed, abaxially rounded and sparsely armed with hooked, black-tipped spines up to 5 mm long; leaflets 5 – 9 on each side of the rachis, mostly swept forward, strongly grouped in pairs, pairs more or less opposite, lowest group with a single leaflet each side, terminal leaflets in a group of four, the distal pair connate along 20 – 40% of their length, lanceolate, up to 14 – 25 × 1.8 – 3.4 cm, adaxial midrib prominent, two lateral costae sub-prominent, abaxially 1 – 3 veins sub-prominent, no bristles on ad- or abaxial faces, leaflet margins naked or with very occasional stiff bristles, including one or two close to the tip, transverse veinlets many, slightly sinuous, not interrupted. Inflorescences very slender, flagelliform, 1.3 – 2.2 m excluding terminal flagellum, very weakly branched, the male ones barely branched to two orders, the basal partial inflorescences up to 11 cm long including a stalk (or, equally, a secondary bract) up to 1.5 cm, with one terminal rachilla 3.5 – 4.5 cm long and one or rarely up to three shorter side branches, distal partial inflorescences rarely branched; primary branches swollen at base; rachillae slender, rachilla bracts with two acute limbs, one appressed to axis, one free; involucre inserted in rachilla bract and also bearing two acute limbs;