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New Species of *Calamus* (Palmae) from Lao and Myanmar

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ABSTRACT: This paper concerns southern Asian species of *Calamus* from Beccari's Groups V and VI. *Calamus floribundus* var. *depauperatus* is recognized as a distinct species, *C. meghalayensis*; *C. kingianus* is recognized as a distinct species from northeastern India and the Lao population of *C. kingianus* is recognized as a separate species, *C. evansii*; recently collected specimens from northern Myanmar are recognized as two distinct species, *C. hukaungensis* and C. *spicatus*; *C. hypoleucus* is recognized as a distinct species from Myanmar and the Lao population of *C. hypoleucus* is recognized as a distinct species, *C minor.* Nomenclature, descriptions, illustrations, specimens examined, and distribution maps are given for the new species.

KEY WORDS: *Calamus*, Palmae, Arecaceae, Southern Asia, Lao, Myanmar.

INTRODUCTION

Calamus is the largest genus of palms, currently thought to contain 374 species (Govaerts and Dransfield, 2005). The subgeneric classification is in a state of flux (Beccari, 1908; Furtado, 1956; Dransfield, 1979; Kramadibrata, 1992; Evans, 2002; Baker et al., 2000), and Beccari's (1908) system, as modified by Furtado (1956) and Dransfield (1979), is still used pending a modern treatment of the problem. Beccari recognized sixteen informal groups of species - this paper concerns species from his Groups V and VI.

In preparation for the *Field Guide to the Palms of Southern Asia* (A. Henderson, in prep.), specimens of these two groups of *Calamus* from the region have been collected and examined. Comparison of these specimens with the relevant literature (Griffith, 1845, 1850; Hooker, 1894; Kurz, 1874; Beccari, 1908, 1913; Basu, 1992; Evans et al., 2001, 2002) shows the following rearrangements within the two groups are necessary.

Group V occurs throughout the Asian tropics. A subset of closely related species (Beccari's species numbers 31-42) was characterized by its few, broad, lanceolate or elliptic pinnae. Beccari (1908) considered two of these from northeastern India, *C. kingianus* and *C. floribundus,* to be closely related and described a variety of the latter, var. *depauperatus*. Of this, Beccari reported that it "seems almost a different species." These three taxa were accepted by Basu (1992). More recently, Evans et al. (2001, 2002) included specimens from central Lao in *C. kingianus*, thus recognizing a widespread species with two disjunct populations.

After study of specimens of these taxa, the following changes are made. *Calamus floribundus* var. *depauperatus* is raised to rank of species, *C. meghalayensis*; *C. kingianus* is recognized as a distinct species from northeastern India and the Lao population of *C. kingianus* is recognized as a separate species, *C. evansii*; and similar, recently collected specimens from northern Myanmar are recognized as distinct species, *C. hukaungensis* and *C. spicatus*.

Group VI, also widespread in the Asian tropics, differs from Group V by its open versus closed partial inflorescence bracts. Four similar species (numbers 95-98) were recognized by Beccari (1908) from southern Myanmar and Peninsula Thailand; *C. platyspathus, C. myrianthus, C. hypoleucus,* and *C. leucotes*. Evans et al. (2001) included specimens from central Lao in *C. hypoleucus*, thus recognizing a widespread species with two disjunct populations. Following study of specimens of these species, the Lao population of *C. hypoleucus* is recognized as a distinct species, *C minor*.

Nomenclature, descriptions, illustrations, specimens examined, and distribution maps are given for each of the new species, as well as for *Calamus meghalayensis*.

TAXONOMIC TREATMENTS

1. *Calamus evansii* A. Henderson, sp. nov.

Figs. 1A & 2A

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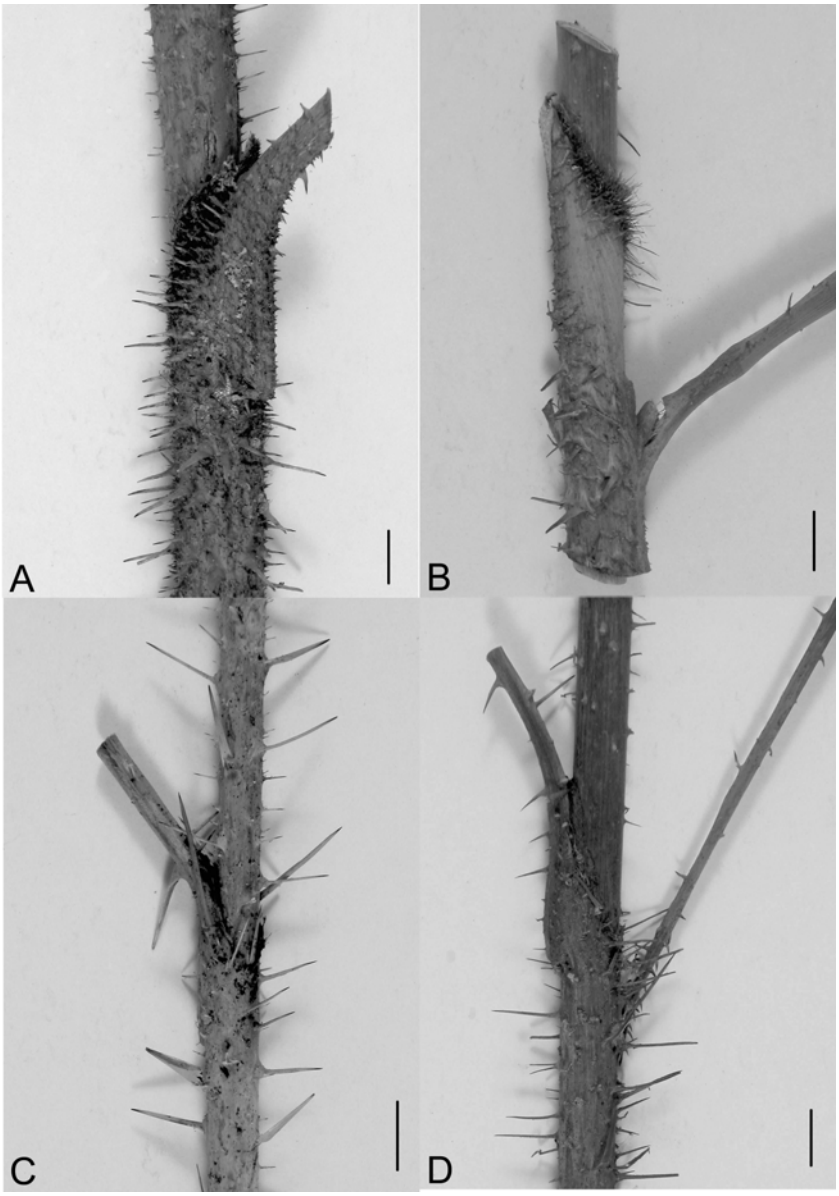


Fig. 1. Leaf sheaths. A: *C. evansii* (from *Khamphone Sengdala et al. 375*). Scale bar = 1 cm. B: *C. hukaungensis* (from *Henderson et al. 3174*). Scale bar = 1 cm. C: *C. minor* (from *Khamphone Sengdala & Evans 319*). Scale bar = 1 cm. D: *C. spicatus* (from *Henderson et al. 3138*). Scale bar = 1 cm.

TYPE: LAO. Khammuane: Nakai District, Ban Malua, Phon Nong Na, 17°40'N, 105°24'E, 520 m, 9 Mar 1999, *Khamphone Sengdala, Banxa Thammavong, Oulathong V. Viengkham, & T. Evans 375* (HOLOTYPE: K!).

A Calamo kingiano differt pinnis longioribus et inflorescentiis bracteis primariis dense spinosis.

Stems clustered, 2.5-7 m long and 0.6-1.3 cm diameter (with leaf sheaths). Leaf sheaths green, with patchy, white tomentum initially, sparsely to densely covered with brown, black-tipped, flattened, horizontally spreading spines to 1 cm long, sometimes with many short spines interspersed; knees present; ocreas present, less than 0.5 cm long, densely covered with short, black bristles; flagella present; petioles 15-21 cm long, sparsely covered laterally and abaxially with recurved spines to 0.5 cm long; rachis 41-43 cm long, laterally and abaxially with few, recurved, solitary spines; pinnae 3-6 per side of rachis, lanceolate, arranged in distant groups or solitary, 30-43 cm long, 2.0-3.5 cm wide, without spines on the margins, minutely spiny at the apex, the apical pair of pinnae free or only briefly joined at their bases; cirri absent. Inflorescences 1.5-3 m long, flagellate; partial inflorescences inserted below the mouth of the partial inflorescence bracts; partial inflorescence bracts closely sheathing the main axis, briefly split at the apex, not bristly at the apex, densely covered with recurved spines; staminate inflorescences branched to three orders, with 5-7

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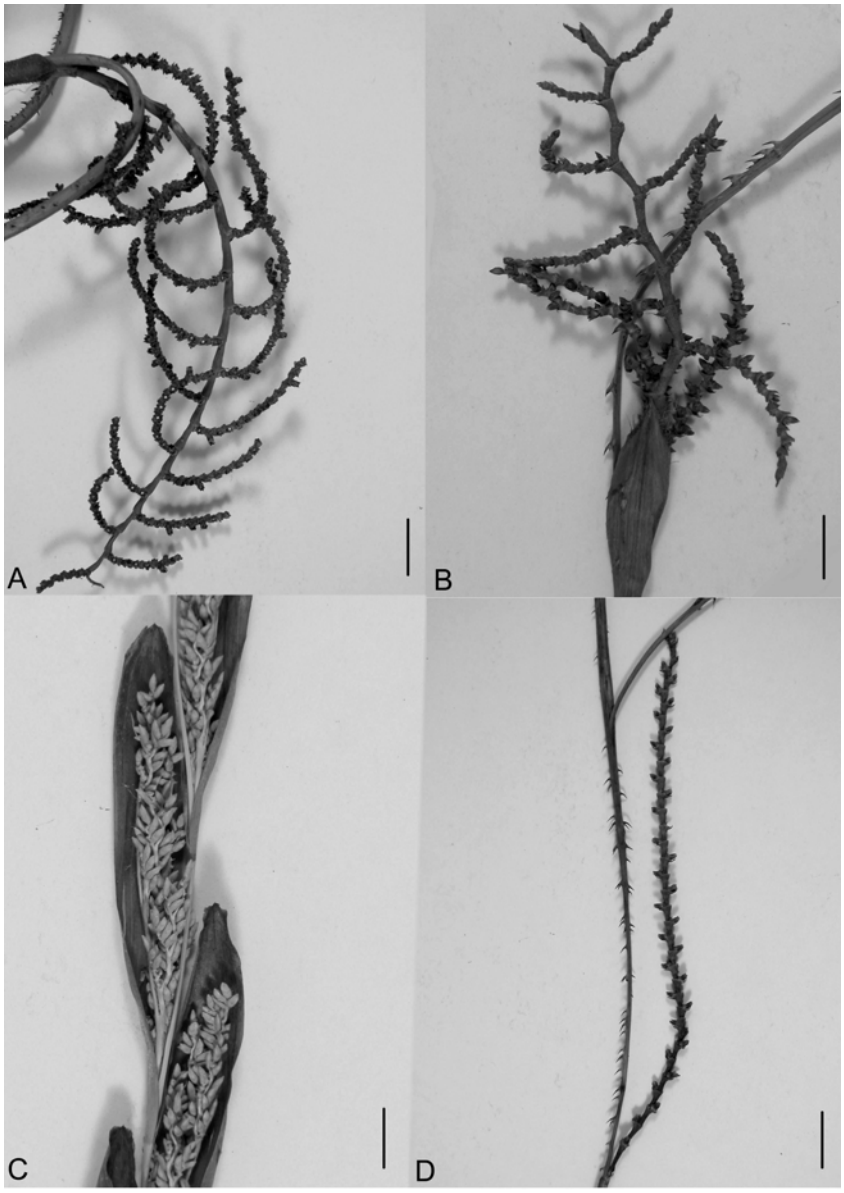


Fig. 2. A: Partial pistillate inflorescence of *C. evansii* (from *Khamphone Sengdala et al. 375*). Scale bar = 1.75 cm. B: Partial pistillate inflorescence of *C. hukaungensis* (from *Henderson et al. 3174*). Scale bar = 1 cm. C: Partial staminate inflorescence of *C. minor* (from *Khamphone Sengdala & Evans 319*). Scale bar = 1 cm. D: Partial pistillate inflorescence of *C. spicatus* (from *Henderson et al. 3138*). Scale bar = 2.1 cm.

partial inflorescences; rachillae 2-3 cm long; rachillae bracts distichously arranged, to 1 mm long, glabrous; floral bracteoles to 0.5 mm long, glabrous; staminate flowers not seen, arranged alternately and distichously along the rachillae; pistillate inflorescences branched to two orders, with 3-10 partial inflorescences, each with up to 19 rachillae; rachillae 3-8 cm long; rachillae bracts distichously arranged, to 2 mm long, glabrous; pistillate flowers to 12 per rachilla, borne alternately and distichously along the rachillae; sepals to 1.5 mm long, connate basally for ca. two-thirds their length, lobed above; petals to 2 mm long, free; fruits not seen.

Local names and uses: leum, wai leum (Lao); the stems are used for handicrafts.

Distribution and habitat*:* Lao (Khammuane) (Fig. 3A); lowland forest, at 520-530 m elevation.

Notes: Lao specimens were included by Evans et al. (2002) in *Calamus kingianus*. However, they are morphologically and geographically distinct. The most noticeable difference is the shorter staminate rachillae of the Lao specimens (2-3 cm, versus 4-9 cm in *C. kingianus*), with the terminal rachilla of a partial inflorescence not longer than the others (versus longer in *C. kingianus*).

Additional specimens examined: LAO. Khammuane: Nakai District, Ban Malua, Phon Nong Na, 17°40'N, 105°24'E, 530 m, 8 Mar 1999, *Khamphone et al. 366* (K); same locality, same date, *Khamphone et al. 367* (K).

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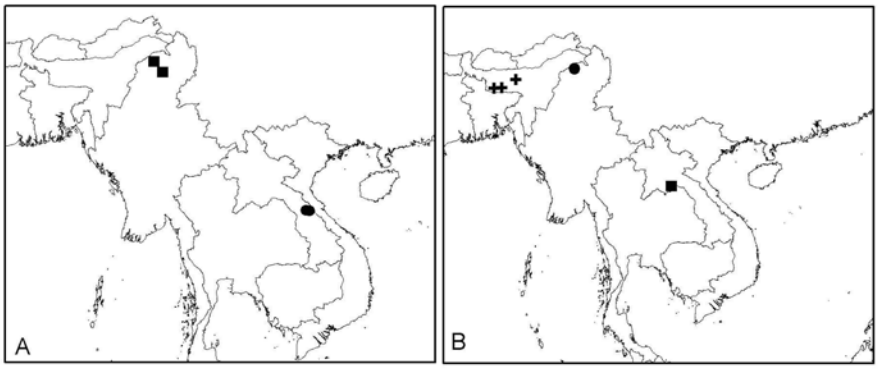


Fig. 3. Distribution maps. A: *C. evansii* (●) and *C. hukaungensis* (■). B: *C. meghalayensis* (+), *C. minor* (■) and *C. spicatus* (●).

2. ***Calamus hukaungensis*** A. Henderson, sp. nov. Figs. 1B & 2B

TYPE: MYANMAR. Kachin: Ledo road, Tanai Township, 38 km S of Tanai toward Myitkyina, 26°03'N, 96°43'E, 285 m, 3 Feb 2005, *A. Henderson, C. Peters, U Saw Lwin, U Myint Maung, U Tin Maung Ohn, U Tun Shaung, U Kyaw Lwin 3174* (HOLOTYPE: NY! ISOTYPES: K! RAF! RANG!).

A similaribus speciebus differt inflorescentiis bracteis primariis marginibus apicibus dense setosis.

Stems clustered, to 4 m long and 0.8-1 cm diameter (with leaf sheaths). Leaf sheaths greenish-brown with whitish tomentum, densely covered with reddish-brown, flattened, horizontally spreading spines to 1 cm long, with a non-spiny, swollen area both sides of sheath between petiole insertion and knee; knees present; ocreas present, to 0.5 cm long, densely bristly; flagella present, to 1.5 m long; petioles 12-22 cm long, sparsely covered laterally and abaxially with recurved spines to 0.5 cm long; rachis 16-30 cm long, abaxially with few, recurved, solitary spines; pinnae 4-6 per side of rachis, lanceolate, arranged in distant groups, 20-30 cm long, 2.5-3.5 cm wide, without spines except at apices, the apical pair of pinnae joined at their bases for one quarter to one half their length; cirri absent. Inflorescences to 2 m long, flagellate; partial inflorescences inserted below the mouth of the partial inflorescence bract; partial inflorescence bracts , closely sheathing the main axis except at the apex, where open and flat (and apparently tattering), with few, very short, recurved spines, the apical margins densely covered with bristles as the ocrea; staminate inflorescences branched to three orders, with up to 3 partial inflorescences; rachillae to 1.5 cm long; rachillae bracts distichously arranged, to 1 mm long, glabrous except for ciliate margins; floral bracteoles 0.5 mm long, glabrous; staminate flowers to 3 mm long, to 14 per rachilla, arranged alternately and distichously along the rachillae; calyx 2 mm long, tubular except for the 3-lobed apex; corolla 3 mm long, with 3 valvate petals free to the base; pistillode 0.5 mm long; pistillate inflorescences branched to two orders, with up to five partial inflorescences, each with up to 15 rachillae; rachillae 1.5-5 cm long; rachillae bracts distichously arranged, 2 mm long, with brown hairs; pistillate flowers to 20 per rachilla, borne alternately and distichously along the rachillae; sepals to 3 mm long, connate basally for ca. two-thirds their length, lobed above; petals to 3 mm long, free; fruits not seen.

Local names and uses: htin phu (Naga language); the stems used for weaving.

Distribution and habitat: Myanmar (Kachin)(Fig. 3A); lowland forest on flat land, at 190-285 m elevation.

Notes: Distinguished from other species in Group V by its partial inflorescences inserted below the mouths of the partial inflorescence bracts, which are open at the apex and have densely bristly apical margins.

Additional specimen examined: MYANMAR. Kachin: Shinbwiyang gold mine, disturbed area near mine, 26°41'N, 96°13'E, 190 m, 14 Jan 2005, *Henderson et al. 3125* (K, NY, RAF, RANG).

3. ***Calamus meghalayensis*** A. Henderson, stat. & nom. nov. *Calamus floribundus* var. *depauperatus* Becc., Ann. Roy. Bot. Gard. (Calcutta) 11: 79. 1908. Type. INDIA. Meghalaya: Gari in the Garo Hills, no date, *C. Clarke s. n.* (HOLOTYPE: FI-B n.v.; holotype image in Beccari 1913).

Stems to 2 m long and 0.5-0.6 cm diameter (with leaf sheaths). Leaf sheaths green with brown tomentum, sparsely covered with brown, flattened, horizontally spreading spines to 1 cm long; knees present; ocreas present, less than 0.5 cm long, densely bristly; flagella present, to 2 m long; petioles

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6-18 cm long, sparsely covered laterally and abaxially with recurved spines to 0.5 cm long; rachis 9-24 cm long, abaxially with few, recurved, solitary spines; pinnae 4-5 per side of rachis, lanceolate, arranged in distant groups or solitary, 13-23 cm long, 2-3.5 cm wide, minutely spiny along the margins, the apical pair free or briefly joined at their bases; cirri absent. Inflorescences to 1 m long, flagellate; partial inflorescences inserted above the mouth of the partial inflorescence bracts; partial inflorescence bracts closely sheathing the main axis, with recurved spines, bristly at the apex; staminate inflorescences branched to two orders, with up to 3 partial inflorescences; rachillae 0.5-1 cm long; rachillae bracts distichously arranged, to 1 mm long, more or less glabrous; floral bracteoles to 0.5 mm long; staminate flowers to 2 mm long, to 20 per rachilla, arranged alternately and distichously along the rachillae; calyx 1.5 mm long, tubular except for the 3-lobed apex; corolla 2 mm long, with 3 valvate petals free to the base; pistillode 1 mm long; pistillate inflorescences branched to two orders, with up to three partial inflorescences, each with up to 12 rachillae; rachillae 1-2.5 cm long; rachillae bracts distichously arranged, to 2.5 mm long, with brown hairs; pistillate flowers to 20 per rachilla, borne alternately and distichously along the rachillae; sepals to 3 mm long, connate basally for ca. two-thirds their length, lobed above; petals to 3 mm long, free; fruits not seen, according to Basu (1992) globose, to 1 cm diameter, yellowish.

Local names and uses: risigin, tairu, rita (India); no uses recorded.

Distribution and habitat: Northeastern India (Meghalaya)(Fig. 3B); lowland forest at low elevations in the Khasi Hills.

Notes: Although the type specimen has not been seen, Beccari's (1908) description and photograph (Beccari, 1913, plate 48) of *C. Clarke s. n.* shows it to be clearly distinct from *C. floribundus*, as suggested by Beccari himself (1908). Not only is it (and the specimens cited below) smaller in all dimensions, but the leaf sheath spines are quite different from those of *C. floribundus*. The name *C. meghalayensis* is given here because the eipthet *depauperatus* is preoccupied (*Calamus depauperatus* Ridl.)

Additional specimens examined: INDIA. Meghalaya: Nenkra, Garo Hills, 6 Jan 1930, *Parry 837a* (K); Bamanigaon, in swamp, near sea level, 20 Nov 1949, *Thakur Rup Chand 2493* (BH); Rani, 4 Feb 1952, *W. Koelz 29229* (BH).

4. ***Calamus minor*** A. Henderson, sp. nov.
Figs. 1C & 2C

TYPE: LAO. Bolikhamsay: Thaphabat Province, close to Ban Hatkhai, 18°24'N, 103°09'E, 140 m, 17 Dec 1998, *Khamphone Sengdala & T. Evans 319* (HOLOTYPE: K!).

A Calamo hypoleuco differt caulibus 2.5-3 m longis; foliis vaginis spinis usque 1 cm longis, vaginis apicibus spinis interdum usque 2 cm longis.

Stems clustered, 2.5-3 m long and 0.7-1 cm diameter (with leaf sheaths). Leaf sheaths greenish-yellow, sparsely covered with brown, black-tipped, flattened, horizontally or upward spreading spines to 1.4 cm long, those at sheath apex sometimes to 2.5 cm long; knees present; ocreas present, to 0.3 cm long, fibrous, disintegrating; flagella absent; petioles 3-10 cm long, sparsely covered laterally and abaxially with recurved spines to 0.5 cm long; rachis 40-70 cm long, abaxially with few, recurved, solitary spines; pinnae 5-6 per side of rachis, lanceolate, regularly but distantly arranged, 15-30 cm long, 1.7-4 cm wide, gray abaxially, without marginal spines except near apices, the apical pair of pinnae only briefly joined at their bases; cirri absent. Inflorescences 0.2-0.4 m long, briefly or not flagellate; partial inflorescences inserted at the base of the partial inflorescence bract; partial inflorescence bracts open and not sheathing the main axis, not spiny; staminate inflorescences branched to three orders, with 4-6 partial inflorescences; rachillae to 0.5 cm long; rachillae bracts distichously arranged, to 1 mm long, glabrous; floral bracteoles 0.5 mm long, glabrous; staminate flowers to 3.5 mm long, to 10 per rachilla, arranged alternately and distichously along the rachillae; calyx 2 mm long, tubular except for the 3-lobed apex; corolla 3 mm long, with 3 valvate petals free to the base; pistillode absent; pistillate inflorescences branched to two orders, with up to six partial inflorescences; rachillae to 1.5 cm long; rachillae bracts distichously arranged; pistillate flowers not seen; fruits not seen.

Local names and uses: wai deng, wai hangnou (Lao); the shoot is edible and the stems used for handicrafts.

Distribution and habitat: Lao (Bolikhamsay) (Fig. 3B); lowland forest, at 140-160 m elevation.

Notes: The Lao specimens cited here were included by Evans et al. (2002) in *Calamus hypoleucus*, a species known only from Myanmar. However, as noted by Evans et al., the Lao specimens have longer leaves and narrower pinnae, these with spiny margins near the apex, and longer inflorescences.

Additional specimens examined: LAO. Bolikhamsay: Thaphabat Province, Bhat kai, 18°24'N, 103°08'E, 160 m, 10 Apr 1998, *Khamphone et al. 138* (K); Thaphabat Province, close to Ban Hatkhai, 18°24'N, 103°09'E, 140 m, 17 Dec 1998, *Khamphone & Evans 320* (K); same locality, same date, *Khamphone & Evans 321* (K).

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5. ***Calamus spicatus*** A. Henderson, sp. nov. Figs. 1D & 2D

TYPE: MYANMAR. Kachin: Ledo road, N of Shinbwiyang, 26°49'N, 96°12'E, 963 m, 18 Jan 2005, *A. Henderson, C. Peters, U Saw Lwin, U Myint Maung, U Tin Maung Ohn, U Tun Shaung, U Kyaw Lwin 3138* (HOLOTYPE: NY! ISOTYPES: K! RAF! RANG!).

A Calamo kingiano differt inflorescentiis spicatis parte pistillatis.

Stems clustered, 3-4 m long and to 1 cm diameter (with leaf sheaths). Leaf sheaths green with reddish-brown tomentum, sparsely to densely covered with brown or black, flattened, horizontally spreading spines to 1 cm long; knees present; ocreas less than 0.5 cm long, with spines as the sheath; flagella not seen, absent?; petioles 22-44 cm long, sparsely covered laterally and abaxially with straight spines to 1 cm long; rachis 43-65 cm long, abaxially with few, recurved, solitary spines; pinnae 4-10 per side of rachis, lanceolate, arranged in distant groups or solitary, 24-37 cm long, 2-2.5 cm wide, minutely spiny along the margins, the apical pair of pinnae free or briefly joined at their bases; cirri absent. Inflorescences to 2 m long, flagellate; partial inflorescences inserted near or just below the mouth of the partial inflorescence bracts; partial inflorescence bracts closely sheathing the main axis, becoming split, not bristly at the apex, with recurved spines; staminate inflorescences branched to two orders, with up to 7 partial inflorescences; rachillae 6-10.5 cm long, the terminal rachilla of a partial inflorescence the longest; rachillae bracts distichously arranged, to 3.5 mm long; floral bracteoles to 1 mm long, glabrous except for ciliate margins; staminate flowers to 4 mm long, to 44 per rachilla, arranged alternately and distichously along the rachillae; calyx 2.5 mm long, tubular except for the 3-lobed apex; corolla 4 mm long, with 3 valvate petals free to the base; pistillode 1 mm long; pistillate inflorescences branched to one order, with 2-4 partial inflorescences, each consisting of a single rachilla; rachillae 7-16 cm long; rachillae bracts distichously arranged, glabrous, to 3 mm long; pistillate flowers to 40 per rachilla, borne alternately and distichously along the rachillae; sepals to 3.5 mm long, connate basally for ca. two-thirds their length, lobed above; petals to 3 mm long, free; fruits not seen.

Local names and uses: kyetu kyein (Myanmar); no uses recorded.

Distribution and habitat: Myanmar (Kachin, Sagaing) (Fig. 3B); lowland forest at 500-1040 m elevation.

Notes: The recently collected specimens from Myanmar of this species, at least the staminate ones, closely match the type photograph of *Calamus kingianus* (Beccarai, 1913, plate 53). However, Basu (1992) described and illustrated the pistillate inflorescences of *C. kingianus* as being branched to two orders, unlike the unbranched ones of *C. spicatus*.

Additional specimens examined: MYANMAR. Sagaing: Ledo road, Mile 22 Camp between Namyung and Shinbwiyang, 26°54'N, 96°13'E, 1040 m, 21 Jan 2005, *Henderson et al. 3145* (K, NY, RAF, RANG); Ledo road, between Namyung and Shinbwiyang, 26°52'N, 96°12'E, 881 m, 22 Jan 2005, *Henderson et al. 3147* (K, NY, RAF, RANG); Ledo road, between Namyung and Shinbwiyang, 26°52'N, 96°12'E, 881 m, 22 Jan 2005, *Henderson et al. 3150* (K, NY, RAF, RANG).

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印度及寮國的棕櫚科省藤屬新種

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摘　　要

本篇文章旨在發表記錄南亞棕櫚科省藤屬的幾個新種及新紀錄，這些主要包括有分布在印度及寮國的 *Calamus meghalayensis*, *C. kingianus*, *C. evansii*, *C. hukaungensis*, *C. spicatus*, *C. hypoleucus* 以及 *C. minor* 等種類。本文也詳細提供新種的描述、特徵文獻及分布圖。

關鍵詞：省藤屬、棕櫚科、Arecaceae、南印度、寮國、Myanmar。

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