

New Species of *Calamus* from Cambodia

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Two new species of *Calamus* from Cambodia are described and illustrated, and compared with similar species.

Calamus, the largest genus of palms, contains 374 species (Govaerts & Dransfield 2005), widely distributed throughout the Asian tropics with outliers in Africa and the Pacific. In the course of a revision of the genus (Henderson, in prep.), the following new species have been collected in Cambodia.

Calamus mellitus Henderson & Khou Eang Hourt, **sp. nov.**, differs from related species (*C. gracilis*, *C. melanacanthus* and *C. lateralis*) in its clustered habit and irregular seeds. Type. Cambodia. Battambang: Samlot district, Takoak commune, Phnom Rey village, 12.494°N, 102.754°E, ca. 200 m, 4 February 2013, A. Henderson, Khou Eang Hourt, Chey Koulang, Ou Ratanak, Tam Le Viet & Prak Ousopha 3839 (Holotype: RUPP; Isotypes: AAU, NY). (Fig. 1)

Stems clustered, climbing, 10–100 m long, 1.2–2.5 cm diameter with sheaths, with a mound of visible roots at the base. Leaf sheaths tubular, closed opposite the petioles, green with whitish and brownish tomentum giving a mottled appearance, with short, swollen-based, scattered spines to 0.5 cm long; knees present; ocreas scarcely developed, with two low, lateral ridges either side of sheath, absent from adaxial petiole surface; flagella present, well-developed; petioles 6.8–34.0 cm long;

rachises 45.7–90.5 cm long; pinnae 25–27 per side of rachis, regularly arranged, linear, the middle ones 21.5–41.5 cm long, 1.1–1.7 cm wide, the apical pair free almost to the base; cirri absent. Inflorescences arching, the partial inflorescences branched, the rachis bracts tubular, narrow, briefly splitting at the apices; staminate inflorescences not seen; pistillate inflorescences 200 cm long, narrow and elongate, with long flagellate apices; partial pistillate inflorescences an open raceme, with spreading rachillae to 8.2 cm long; fruiting perianths tubular; fruits ellipsoid, 21.2 mm long, 15.3 mm diameter, orange-brown, 1-seeded; seeds covered with a tanniniferous sarcotesta, seeds irregularly ellipsoid, the surfaces pitted; endosperm with numerous, deep, pit-like ruminations; embryos lateral in seed.

Local names and uses: *toek kamon*, *phdao toekkhmun*. The palm is locally known as the honey rattan because its cut stems smell of honey. It produces a good quality, flexible cane exported to both Thailand and Vietnam.

Distribution and habitat: Cambodia (Battambang, Pursat) in lowland or montane evergreen forest, at 200–927 m elevation.

Notes: In Khou (2009) this species was listed as *Calamus* sp. Specimens will not key in either



1. *Calamus mellitus*. A. habit. B. Leaf sheath showing insertion of flagella. C. Leaf. D. Fruit.

Henderson (2009) or Hodel (1998). In the course of a revision of *Calamus* (Henderson, in prep.), phylogenetic analysis of morphological

data comprising 90 characters taken from 2424 specimens representing 283 species of *Calamus*, two of *Ceratolobus*, six of *Daemonorops*, two of



2. *Calamus kampucheaensis*. A. base of stem with shoots. B. Leaves. C. Leaf sheath and ocreas. D. Spicate partial pistillate inflorescence.

Pogonotium, and one of *Retispatha*, with *Plectocomia* as outgroup, shows that *Calamus mellitus* is placed in a clade along with *C. gracilis*, *C. melanacanthus*, and *C. lateralis*. All four species have rather distinctive, mottled tomentum on the leaf sheaths and inflorescences, and seeds with lateral embryos. They also share a distinctive arrangement of knees and flagella. Knees are keeled from the base of the petiole downwards, and the flagella, inserted high on the sheath, has two lateral ridges running from the point of insertion to the sheath apex. *Calamus mellitus* differs from *C. lateralis* in its clustered stems and ruminant endosperm; from *C. gracilis* in its regularly arranged pinnae; and from *C. melanacanthus* in its irregularly shaped seeds with pitted surfaces (versus regularly shaped seeds with highly sculpted, irregular surfaces).

Additional specimens examined.

CAMBODIA. PURSAT: Veal Veng district, Khnang 1500, Yeay Mao area, on the road to Thmor Da, Anlung Reap commune, 12.210N, 102.902E, 927 m, 5 February 2013, A. Henderson, Khou Eang Hourt, Chey Koulang, Ou Ratanak, Tam Le Viet & Prak Ousopha 3840 (NY, RUPP); Veal Veng district, village 80, commune Anlung Reap, 12.241N, 102.923E, 350 m, 6 February 2013, A. Henderson, Khou Eang Hourt & Chey Koulang 3843 (NY, RUPP).

Calamus kampucheaensis Henderson & Khou Eang Hourt, **sp. nov.**, differs from other related species (*C. modestus*, *C. dianbaiensis*, *C. wuliangshanensis*, *C. rhabdocladus*, *C. yentuensis*, *C. albidus* and *C. macrorhynchus*) in its spicate partial inflorescences and production of bulbils on the inflorescences. Type: Cambodia. Pursat: Veal Veng district, Anlung Reap commune, Khnang 1500, Yeay Mao area, on the road to Thmor Da, 12.201°N, 102.904°E, 1200 m, 6 February 2013. A. Henderson, Khou Eang Hourt & Chey Koulang 3842 (Holotype: RUPP; Isotypes: AAU, NY). (Fig. 2)

Stems clustered, non-climbing, to 2 m long and 2.5 cm diameter without sheaths, green, with 6 cm long internodes, with new shoots forming on the stem at or near the base. Leaf sheaths open opposite the petioles, densely brown tomentose, with ridges with long, flat, brown spines, the longest ones to 6 cm long, interspersed with shorter spines; knees absent; ocreas well-developed, to 23 cm long, tubular but splitting as leaves develop, with erect spines at the apices; flagella absent; petioles 65–70 cm long, with groups or whorls of long spines as the sheath; rachises 35–42 cm long,



3. *Calamus kampucheaensis*, young plant forming at end of inflorescence.

with long, straight spines abaxially; pinnae 77–98 per side of rachis, regularly arranged (somewhat irregular in younger plants), linear, the middle ones 32 cm long, 1.4 cm wide, the apical pair free almost to the base; cirri absent. Inflorescences erect, to 1 m long, the partial inflorescences spicate, the bracts tattering; on some plants the inflorescences shorter, without any reproductive structures but the apex bulbous and forming a new plant; staminate inflorescences with 8 or more partial inflorescences; rachillae to 6 cm long, pedicellate; staminate flowers 7 mm long; sepals forming a 3-lobed corolla to 6 mm long; petals free, valvate; stamens 7, the filaments inflexed at the apices; pistillate inflorescences with 2 partial inflorescences; rachillae 9 cm long, pedicellate; pistillate flowers 8 mm long; sepals forming a 3-lobed corolla to 5 mm long; petals almost the same length as sepals. Fruits not known.

Local names and uses: *phdao banla dong penh*. No uses recorded.

Distribution and habitat: Cambodia (Pursat) in montane evergreen forest above 1200 m elevation. Local people report this species from several mountain tops in the Cardamom Mountains, e.g., Phnom Khmoach in Pursat province, Phnom Khnang Veal in Kampong

Speu province, and Khnang Lok in Koh Kong province.

Notes: In Khou (2009) this species was noted as being unknown. Specimens will not key in either Henderson (2009) or Hodel (1998). In same study of *Calamus* cited above (Henderson, in prep.), *Calamus kampucheaensis* is placed in a clade along with a group of Indochinese, mostly non-climbing species (*C. modestus*, *C. dianbaiensis*, *C. wuliangshanensis*, *C. rhabdocladus*, *C. yentuensis*, *C. albidus*, *C. macrorhynchus*). *Calamus temii*, although not included in this study, also appears to belong in this group. *Calamus kampucheaensis* differs from all of these in its spicate partial inflorescences and production of bulbils on some inflorescences.

Calamus kampucheaensis has a variety of means of reproducing, apart from sexual reproduction. Young plants form on the stem at or near the base (Fig. 2A). Similar young plants form, first as bulbils, at the apices of inflorescences (Fig. 3). The species also reproduces by older stems bending down and

rooting at or near the apices, where they touch the soil, in a similar manner to *C. dianbaiensis*.

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Amazon Palm Tour

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