

## Notes on *Cryptocoryne* (Araceae) of Thailand, including a new species from Loei Province

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ABSTRACT. A new species *Cryptocoryne loeiensis* J.D.Bastmeijer, T.Idei & N. Jacobsen is described, and a new variety combination is made.

KEY WORDS: *Cryptocoryne*, Araceae, Thailand, new species.

### INTRODUCTION

During studies of the genus *Cryptocoryne* Fisch. ex Wydler for the Flora of Thailand, it was possible to study a number of populations in the field and obtain first hand knowledge of the variability in polymorphic species. Furthermore it was possible to study the same collections in cultivation, thereby taking into account their phenotypic variation. The polymorphism encountered stems partly from population differences in widespread species, but is also due to variation in soil, rainfall, river and stream topography, and topography of the water catchment area.

*Cryptocoryne cordata* Griff., widely distributed in Malesia, reaches its northernmost limit in peninsular Thailand, where two different varieties are recognized.

As a result of our work on Thai *Cryptocoryne*, it is necessary to describe the following new species and make a new combination.

### TAXONOMIC NOTES

**1. *Cryptocoryne cordata*** Griff. is found with two varieties in Peninsular Thailand:

**1a. var. *cordata*** Not. Plant Asiat. 3: 138. 1851 & Icon. Plant. Asiat. 3, tab. 172. 1851. Type: Malay Peninsula, Griffith 6012 (**K!**, lectotype; **P!**).— *Cryptocoryne kerrii* Gagnep., Not. Syst. 9: 132. 1941, **syn. nov.**— *C. siamensis* Gagnep. var. *kerrii* (Gagnepain) Rataj, Rev. Gen. *Cryptocoryne*, Studie ČSAV, č. 3: 93. 1975. Type: Thailand, Saba Yoi, Songkhla, Kerr 14783 (**K!**, lectotype; **K!**, **BK!**, and drawing at **P!**).— *C. stonei* Rataj, Rev. Gen. *Cryptocoryne*, Studie ČSAV, č. 3: 95. 1975. Type: Malay Peninsula, Pasoh F.R., Yap 156 (**KLU!**, holotype; **L!**).

Thailand.— PENINSULAR: Songkhla [old road 25 km Hat Yai to Rattaphum, Horst s.n. (**BKF!**, **C!**); Hat Yai, Kho Hong Hill, Maxwell 84-271 (**PSU!**); Tha Rae, west of Hat Yai, Schulze 312 (**WAG!**); Narathiwat [S of Narathiwat, Larsen 33077 (**AAU!**, **BKF!**, **P!**); Pa Ye, Sungai Padi, Niyomdham & Ueachirakan 1820 (**BKF!**); N of Sungai Kolok, Scholler s.n. (**BKF!**, **C!**, **M!**); Sungai Padi, Wongso s.n. (**BKF!**, **C!**)].

Distribution.— Peninsular Malaysia and Thailand.

Ecology.— In peat swamp forest at elevation slightly above sea level.

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Notes.— It is characteristic of var. *cordata* that it has a chromosome number of  $2n = 34$ . Morphologically var. *cordata* is characterized by cordate, more or less green to brownish marbled leaves. The tube of the spathe is usually more than 20 cm long, and the limb is usually entirely yellow. Its main distribution is in peninsular Malaysia (Othman et al., 2009) and it reaches just across the border with Thailand into Narathiwat; there are also older collections from Songkhla, but we did not succeed in recollecting it there. The habitat is in peat swamps which are found only in southernmost Thailand.

Chromosome counts: PENINSULAR: Narathiwat: Road 42, S of Narathiwat, NJT 02-21 (=DS 4167) (**BKF, C**); Princess Sirindhorn Peat Swamp Forest Nature Research and Study Centre, NJT 02-26 (=DS 4172) (**BKF, C**).

**1b. var. siamensis** (Gagnep.) N. Jacobsen & D. Sookchaloem, **comb. nov.**— *Cryptocoryne siamensis* Gagnep., Not. Syst. 9: 132. 1941. Type: Thailand, Ban-Wan, Takua Pa, 12-2-1929, *Kerr* 17.094 (**K!**, lectotype; **K!, L!**, and drawing **P!**).— *C. blassii* De Wit, Die Aquarien- und Terrarien-Zeitschrift 13: 115. 1960, **syn. nov.** Type: Thailand, SE Trang, *num.* XXII (**WAG!** spirit, holotype).— *C. evae* Rataj var. *evae*, Folia Geobot. et Phytotax. 9: 314. 1974, **syn. nov.** Type: Cult. Bot. Inst. Sumperk, *Rataj* (**PR** 319735, holotype).— *C. evae* Rataj var. *recordata* Rataj, Folia Geobot. et Phytotax. 9: 314. 1974, **syn. nov.** Type: Cult. Bot. Inst. Sumperk, *Rataj* (**PR** 319736, holotype).— *C. siamensis* Gagnep. var. *ewansii* Rataj, Rev. Gen. *Cryptocoryne*, Studie ČSAV, č. 3: 93. 1975, **syn. nov.** Type: Cult. Bot. Inst. Sumperk, 15-8-1974, *Rataj* (**PR** 335238, holotype). Fig. 1.

For a number of years the status and circumscription of *C. cordata* var. *siamensis* has been problematic. With the study of the natural populations in peninsular Thailand that began in 2002 it has been possible to track down 17 localities for *C. cordata* var. *siamensis*.

It is characteristic of var. *siamensis* that it has a chromosome number of  $2n = 102$ . Morphologically var. *siamensis* is characterized by narrow to broad ovate, more or less purple to brownish (occasionally greenish) leaves which

may sometimes be somewhat bullate. The tube of the spathe is usually ca 10 cm long, and the limb is yellow to more or less brownish tinged. Its main distribution is in southern peninsular Thailand and it reaches just across the border into peninsular Malaysia. The habitat is in limestone streams in peninsular Thailand, and not the far southern granite and peat swamp regions.

There is one accession from North of Satun, NJT 02-52 (**BKF, C**), where the chromosome count seems to be ca  $2n = 68$ . However, this accession needs further study before any firm conclusion can be made.

The various species and varieties recognized here as synonyms have not hitherto been so regarded because previously very few specimens have been available for study, and even this material was cultivated and without locality data. In cultivated material it is possible to distinguish even small differences when the different accessions are seen side-by-side. However, there is no basis for formally describing these varieties without recognizing all the small differences that exist between populations in different streams as distinct taxa.

Thailand.— PENINSULAR: Phangnga [Ban Tamnak, N of Takua Pa, *Schulze* 324, 327 (**WAG!**)]; Krabi [near Krabi, *Schulze* 316-319, (**WAG!**)].

Chromosome counts:  $2n = 102$ : PENINSULAR: Phangnga, Lam Khen, N of Phuket, NJT 02-5 (=DS 4000) (**BKF, C**); N of Ban Lam Pi, N of Phuket, NJT 02-6 (=DS 4003) (**BKF, C**); E of Thung Maphrao, NJT 02-57 (**BKF, C**); turnoff to Sai Rung Waterfall, S of Takua Pa, NJT 02-62 (**BKF, C**); N of Takua Pa, NJT 02-63 (**BKF, C**); S of Ban Bang Nai Sang, NJT 02-65 (**BKF, C**); towards Ton Prai Waterfall, NJT 03-1 (**BKF, C**); Ban Lam Ru, NJT 03-2 (**BKF, C**); road to Ton Prai Waterfall, NJT 03-4 (**BKF, C**); Sai Rung Waterfall, NJT 03-6 (**BKF, C**); SE of Ban Lam Ru, NJT 04-31 (**BKF, C**); Chong Fa Waterfall, N of Khao Lak-Lamru N.P., NJT 04-61 (**BKF, C**); Krabi: SSW of Nong Thale, NJT 02-14 (=DS 4057) (**BKF, C**); Sra Kaeo Cave, NJT 02-15 (=DS 4077) (**BKF, C**); N of Sra Kaeo Cave, NJT 02-17 (=DS 4079) (**BKF, C**); Trang: Peninsula Botanic Garden, Thung Khai, NJT 02-19 (=DS 4098) (**BKF, C**);  $2n = 68$  (?); Satun, N of Satun, NJT 02-52 (**BKF, C**).

2. *Cryptocoryne loeiensis* J.D.Bastmeijer, T.Idei & N.Jacobsen, **sp. nov.** Folia lineari-lanceolata (<math>30 \times 1.5\text{ cm}</math>), margo aliquanto undulata, inordinate denticulata. Spatha circiter 5–6 cm longa; tubus superior alveolatus; limbus puniceus, obliquo prorsus et tortilis; cutis aequaliter asper; collare faucale nullum. Typus: Thailand, Loei, Chiang Khan, along the Mekong River,  $17^{\circ} 52' \text{ N}$ ,  $101^{\circ} 35' \text{ E}$ , cultivated material fl. 1 April 2007, *Bastmeijer* 1145a (holotype **BKF!**; isotypes **C!**, **L!**). Fig. 2.

Creeping rhizome with strongly developed contractile roots. Leaves linear to lanceolate with a pronounced main vein, to 30 cm long and 1.5 cm broad, apex rounded to gradually tapering to a fine point, base attenuate to narrowly attenuate, margin somewhat undulate, irregularly denticulate, green and in exposed light conditions brownish and with brownish markings; petiole to 5 cm long, reddish in sunlight. Spathe ca 5–6 cm long, kettle ca 1.5 cm long and 0.6 cm in diameter, inside with a

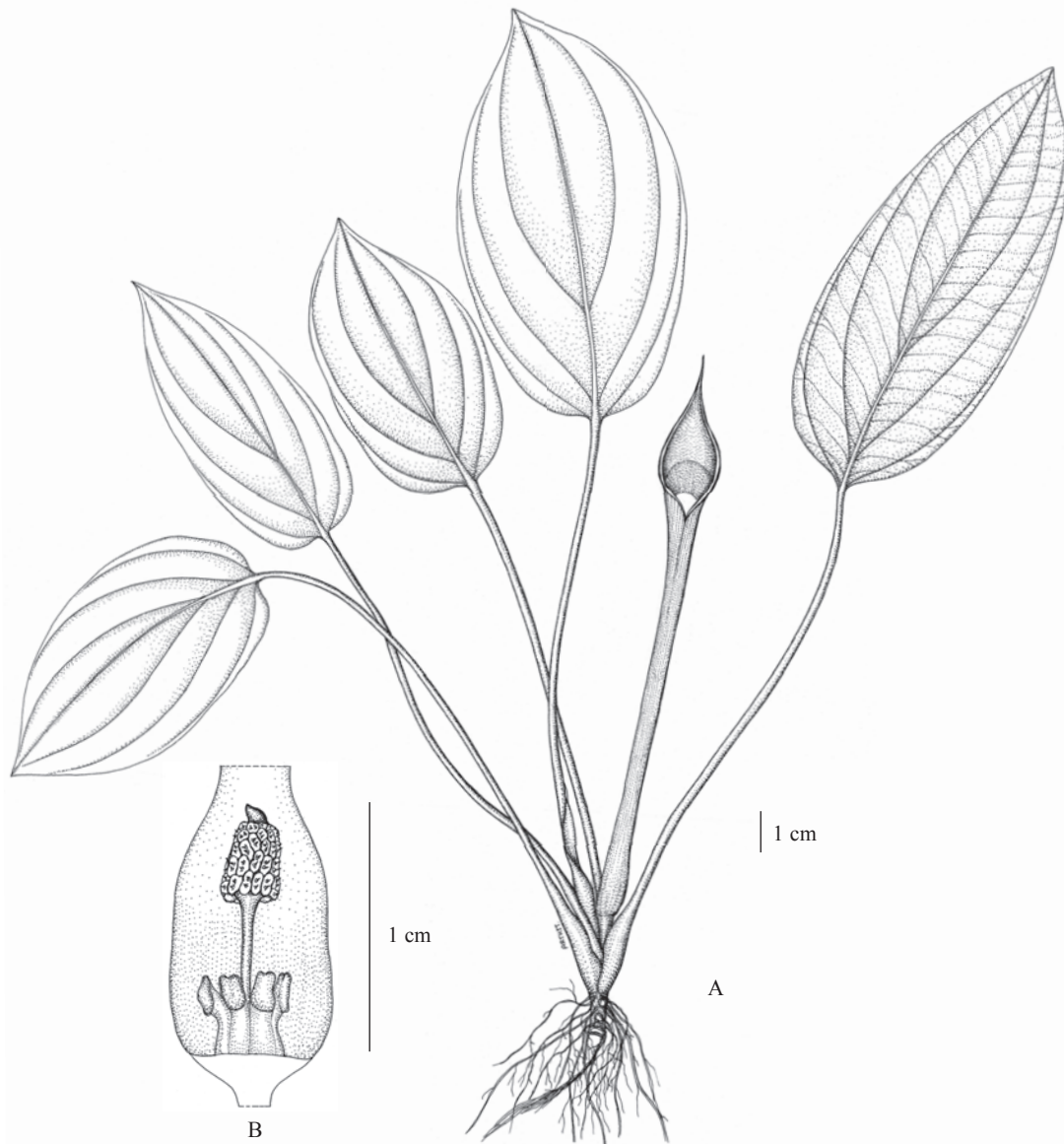


Figure 1. *Cryptocoryne cordata* Griff. var. *siamensis* (Gagnep.) N. Jacobsen & D. Sookchaloem: A: habit; B: inflorescence. Drawn by Arthit Kamgamnerd.

thickened wall at the middle, lower inside wall white, upper part with alveoli (valve whitish, red streaked), red to reddish with small white blotches continuing upwards through the 2–3 cm long tube to the evenly purple to black brown purple, obliquely forward twisted limb, with inner surface evenly rough throughout, and lacking a collar. Spadix with ca 6 female flowers, stigmas round, almost vertical, olfactory bodies irregularly rounded, purplish, male flowers ca 50–60, yellow, theca surface rough from protruding cells. Inflorescence greenish to purplish, elongate ovoid, 1–1.5 cm long, surface smooth. Chromosome number:  $2n = 36$ .

Thailand.— NORTHEASTERN: Loei (Chiang Khan).

Distribution.— Until now only known from Chiang Khan on the Mekong River where Takashige Idei collected it on 29 March 2006. Although it has only been recorded from one area, it may be assumed that it has a wider distribution along the Mekong River.

Ecology.— The species grows on river banks that are exposed during the dry season from February to April (Mekong River Commission, River Monitoring, 2009), partly in full sun. In such



Figure 2. *Cryptocoryne loeiensis* J.D.Bastmeijer, T.Idei & N.Jacobsen: A. habit; B. spathe; C. inflorescence. Drawn by Arthit Kamgamnerd.

places with a strong water current in the flood season it can be found sheltered between rocks and big stones or in leeward places in the winding riverbed, and in sheltered places it can also be found growing in sand and gravel and more or less covered in mud. It has been found growing together with different varieties of *C. crispatula* Engl.

Notes.— During the high water season the leaves become small and terete, but when the plants become emergent full-sized leaves and spathes develop.

In the vegetative parts *C. loeiensis* resembles *C. crispatula*, but differs in the small spathe with an obliquely twisted limb which has a rugose surface, a character not found in *C. crispatula*.

The pollen is perfectly round and fully fertile, it is unlikely that *C. loeii* could be a hybrid.

The rough surface of the limb suggests a relationship with *C. cruddasiana* Prain which is known from upper Myanmar (Bogner, 2009; Bastmeijer, 2010).

Cultivation is easy in loamy sand with or without some peat litter. In prolonged emergent cultivation the plant maintains its seasonal rhythm by the withering of the adult leaves and formation of terete leaves from July, with adult leaves and inflorescences emerging from November.

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