

A new variety of *Cryptocoryne crispatula* Engl. (Araceae) from Thailand

NIELS JACOBSEN¹, JAN D. BASTMEIJER², BHANUBONG BONGCHEEWIN³, TAKASHIGE IDEI⁴,
DUANGCHAI SOOKCHALOEM⁵ & MARIAN ØRGAARD¹

ABSTRACT. The narrow-leaved *Cryptocoryne crispatula* Engl. from the far eastern Thailand has proven to be different from the Vietnamese *C. crispatula* Engl. var. *tonkinensis* (Gagnep.) N. Jacobsen. It is characterized by having the most narrow leaves within *C. crispatula*, and a spathe with a very short tube and a long, conspicuously spirally twisted limb. It is here described as a new variety: *Cryptocoryne crispatula* Engl. var. *kubotae* N. Jacobsen & Bastmeijer, var. nov.

KEY WORDS: *Cryptocoryne*, Araceae, Thailand, new variety

INTRODUCTION

In the recently published volume of Flora of Thailand, the very variable *Cryptocoryne crispatula* Engl. was one of the species which required a more elaborate treatment (Jacobsen *et al.*, 2012); it has a wide distribution area reaching from Eastern India to Southern China and to the South of mainland Asia to Peninsula Thailand. Its habitats cover a number of quite different ecological niche types, such as the main course of the Mekong River, broader, slower water courses like the river at the Samo Poon Bridge in the Khao Yai NP, from torrential to quiet watercourses at the Phu Khiao Wildlife Sanctuary (Jacobsen, 1980, 1991) and quite short streams on the western slopes on the Thai Peninsula like the stream from the Tham Nga Waterfall (Jacobsen & Sookchaloem, 2006; Randal, 2009). The number of documented herbarium specimens is estimated to be around two hundred, indicating that the actual number of sites where *C.*

crispatula occurs may very well be several times that number. Furthermore, many of the localities have numerous equivalent niches, each one a little different from the neighbouring one (e.g. Jacobsen 1980, 1991).

In Flora of Thailand Jacobsen *et al.* (2012) discussed the identity of *C. crispatula* Engl. var. *tonkinensis* (Gagnep.) N. Jacobsen from Khao Yai NP and Ubon Ratchathani. Some doubt was expressed whether this Thai material really represented the same taxon as var. *tonkinensis*, which is typified on material from Mt Ba Vi about 65 km W of Hanoi.

A re-examination of the type material from Ba Vi and in an AFLP study of new samples from north-eastern Vietnam and south-eastern China, material from east of Ubon Ratchathani, from Khao Yai, and from peninsular Thailand has proven that there are four different elements in question (Jacobsen *et al.*, 2015a & b).

¹ Department of Plant- and Environmental Sciences, Faculty of Science, University of Copenhagen, Thorvaldsensvej 40, 1871 Frederiksberg C, Denmark.

² Oude Roswinkelerweg 72, NL 7822 AG Emmen, The Netherlands.

³ Dept. of Pharmaceutical Botany, Faculty of Pharmacy, Mahidol University, 447 Sri-Ayudhaya Road, Rajathevi, Bangkok 10400, Thailand.

⁴ 23-14, 1 Chome Amanogahara, Katano City, Osaka 576-0034, Japan.

⁵ Department of Forest Biology, Faculty of Forestry, Kasetsart University, 50 Phahonyothin Rd., Ladyao, Chatuchak, Bangkok 10900, Thailand.

¹ Author for correspondence: nika@plen.ku.dk

It is therefore necessary to describe the Thai material from east and south of Ubon Ratchathani, as a new variety, as it clearly deviates from the Vietnamese-Chinese material.

DESCRIPTION

Cryptocoryne crispatula Engler var. ***kubotae*** N. Jacobsen & Bastmeijer, **var. nov.** Figs. 1–4.

Submerged leaves 20–70(–100 ?) × 0.2–0.3 cm wide, smooth, mostly brownish; leaves produced during the dry season shorter, 7–15 × 0.3–0.4 cm, smooth, dark greenish-brownish to green often with distinct elongate, irregular to forward slanting line markings. Total spathe length short, to about 10(–15) cm with a strongly spirally twisted limb of the spathe comprising its main part; kettle ca 1 cm, tube short, ca 1–5 cm, and limb 4–8 cm long. The usually distinctly spirally twisted limb has more or less distinct reddish markings. The kettle generally conforms to that found in other varieties of *C. crispatula* in having a somewhat wider lower part with a distinct constriction below the male flowers, and a more narrow upper part which is red inside in the upper part and becoming spotted red downwards. The spadix as in other varieties. Type: Thailand. Ubon Ratchathani region, Pha Taem, *K. Kubota s.n.*, 6 Nov. 2009, flowered 16 Mar. 2012 - cultivated material (holotype **BKF**).

Chromosome number: 2n = 36 (Jacobsen 1980: NJ 3025, under *C. crispatula s.l.*).

Thailand.— EASTERN: *NJ 3005*, no specific locality; *NJT 02-31*, said to come from near Ubon Ratchathani (from the Nursery of Mr Lim Chao Ho) (**C, L**); *Kubota s.n.*, 6 Nov. 2009, flowered 16 Mar. 2012 - cultivated material (**BKF** (holotype)); *K. Kubota s.n.* 9 Nov. 2009 (= B 1336 (=NJ 3445)), Pha Taem, Ubon Ratchathani region (**C, L**); *T. Idei* (report), rivers south of Chong Mek; *Bongcheewin s.n.* (photo), Yot Dome Wildlife Sanctuary, Dome Stream, a branch of Moon River, Nam Yuen District, S of Ubon Ratchathani; in dry evergreen forest with sand stone rapid, alt. ca 200 m.

Based on the above known localities the distribution of var. *kubotae*, in Thailand is assumed to be the eastern province of Ubon Ratchathani in streams coming from the mountains bordering Lao P.D.R. and in the south towards Cambodia.

Notes.— The pictures in FoT 11, 2: Plate LIV, figures A–F represent var. *kubotae*, while the figures G–H, from the Khao Yai NP represent var. *crispatula*.

An overview of all the varieties of *Cryptocoryne crispatula* varieties with pictures and notes on their habitats may be found in Bastmeijer (2015).

Cryptocoryne crispatula var. *kubotae* has been cultivated for more than 35 years in the aquarium hobby as “*tonkinensis*” due to the spectacular narrow leaves, a feature hitherto supposed to be characteristic for *C. crispatula* var. *tonkinensis*. However, the Vietnamese var. *tonkinensis* plants have a coarser leaf structure with a pronounced mid vein and generally the leaves are longer and wider than those from plants originating from the Ubon Ratchathani region. The Vietnamese plants may also have an undulate to crispate leaf margin, which has not been recorded from the Thai material; the spathe tube in var. *tonkinensis* is 20–40 cm long and thereby clearly longer than var. *kubotae*, which is only about 1–5 cm long. Material of Thai var. *kubotae* seems to be very homogenous.

In Nakhon Nayok Prov., in the south-western part of the Khao Yai NP at the Haeo Narok Waterfall and at the road-river crossing at the Samo Poon Bridge there are populations with rather narrow leaves, but they are referred to as narrow leaved forms of var. *crispatula*, because of their long spathe tubes.

At the Samo Poon Bridge crossing the river (Khao Yai NP) there seems to be quite a variation in leaf forms and sizes; plants with leaf blades resembling var. *balansae* (Gagnep.) N. Jacobsen have been observed (*C. Christensen*, pers. comm.). The locality needs a closer study, as it may represent an accumulation site where plants are being washed down from upstream. This may well be a hybridization zone where several “varieties” and hybrids occur.

On the banks of the Mekong at Chiang Khan (Loei Prov.), a narrow leaved *C. crispatula* has been found with a long tube of the spathe, in two forms, one with a pure white, spirally twisted limb and another similar but with purple markings on the limb (and purplish tinged on the outside of the spathe): both may be referred to var. *crispatula*.



Figure 1. *Cryptocoryne crispatula* Engler var. *kubotae* N. Jacobsen & Bastmeijer, A. Bongcheewin s.n., habitat at Yot Dome Wildlife Sanctuary, a branch of Moon River, Nam Yuen District, S of Ubon Ratchathani; B. Cultivated sample from the same locality as A. Photos by: B. Bongcheewin.

The narrow submerged leaves of var. *kubotae* suggest that it is adapted to streams with non-violently to slow running water in the rainy season; during the dry season plants more or less dry out and produce new, shorter emergent leaves. The ecological conditions favour a spathe with a short tube, as it is an advantage to have a shorter, less vulnerable tube, because the limb need not be lifted above the water as is the case in e.g. var. *balansae* and var. *flaccidifolia* N. Jacobsen (Jacobsen, 1980, 1991; Jacobsen & Sookchaloem, 2006) and the true var. *tonkinensis*. These three latter varieties do not produce emergent leaves; if leaves become emergent they become deformed and small or disappear completely.

In emergent cultivation combined with long photoperiods (summer in Europe) var. *kubotae* produces long “submerged”-like leaves short, broader leaves are produced during short days in the winter, the period where it flowers.

The distinguishing characters of *Cryptocoryne*

crispatula var. *kubotae* are the long, narrow, brownish submerged leaves and the shorter, broader often more brownish leaves in the emergent state. The spathe has a remarkable short tube (ca 1–5 cm) and a prominent spirally twisted limb of the spathe with distinct red markings.

Eponymy.— Named in honour of Mr Katsuma Kubota, knowledgeable in aquatic plants. He has supplied aquarists with this plant for many years.

Conservation.— DD (Data Deficient). Although known from several localities, more data are needed in order to generate a conservation assessment.

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Figure 2. *Cryptocoryne crispatula* Engler var. *kubotae* N. Jacobsen & Bastmeijer, A. Kubota s.n. (NJ 3445), Pha Taem, Ubon Ratchathani region (imported plants). Photo by N. Jacobsen.



Figure 3. *Cryptocoryne crispatula* Engler var. *kubotae* N. Jacobsen & Bastmeijer: A. NJT 02-31, said to come from near Udon Thani, with short emergent leaves (cultivated at the nursery of Mr Lim Chao Ho (received from K. Kubota)); B. NJT 02-31, cultivated emergent in Copenhagen, with long “submerged” leaves developing during the short days in the European summer. Photos by N. Jacobsen.

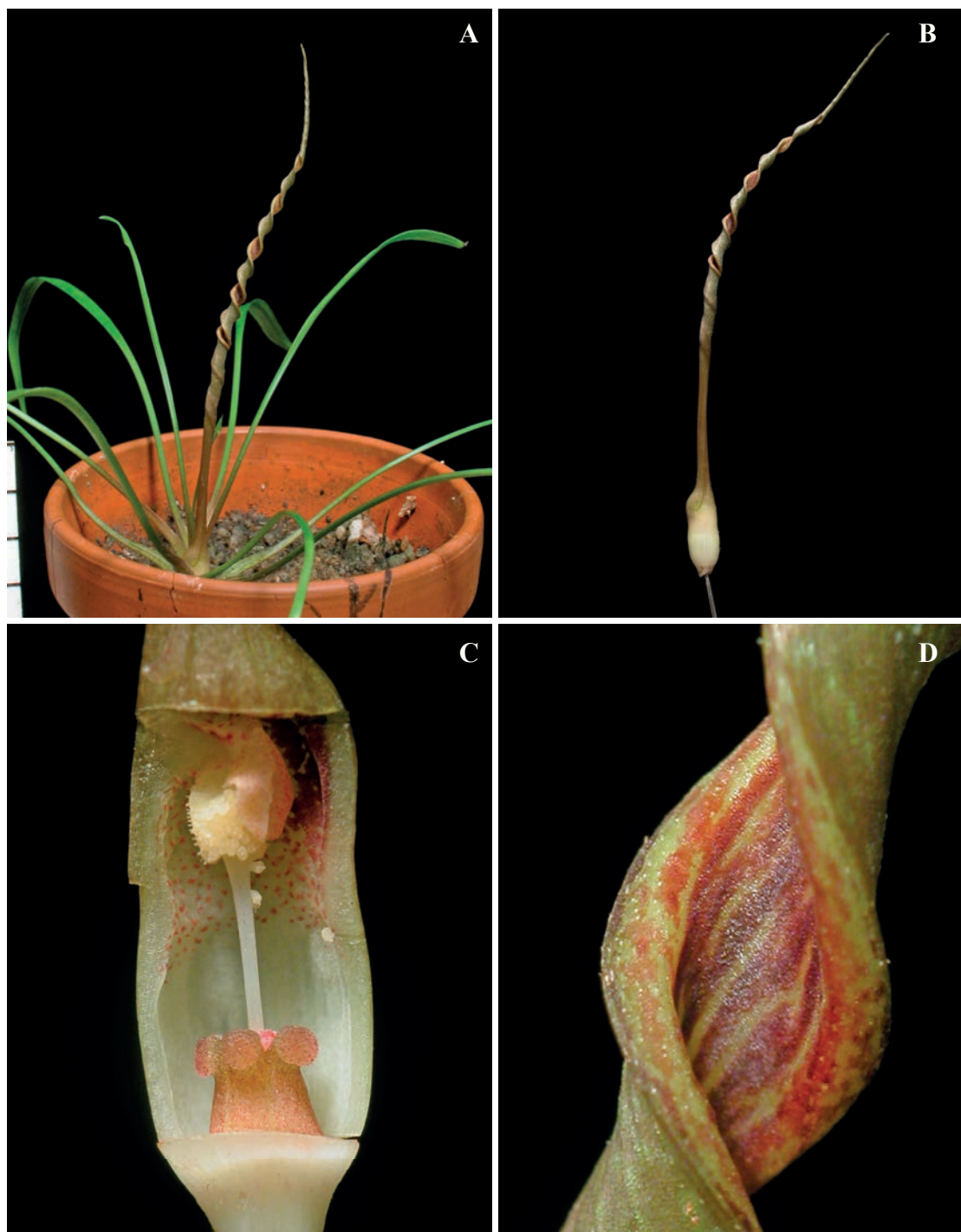


Figure 4. *Cryptocoryne crispatula* Engler var. *kubotae* N. Jacobsen & Bastmeijer: Kubota s.n. (B 1336 (=NJ 3445)), Pha Taem, Ubon Ratchathani region, imported plants (cultivated in Emmen, NL); A: Flowering plant; B. Spathe; C. Opened kettle; D. Limb of spathe. Scales 1 cm. Photos by J. D. Bastmeijer.

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