

# ***Mycetia* (Rubiaceae) from Khao Soi Dao, Chanthaburi Province, SE Thailand: the discovery of a remarkable new species and the true identity of a supposedly endemic species**

CHRISTIAN PUFF<sup>1</sup>

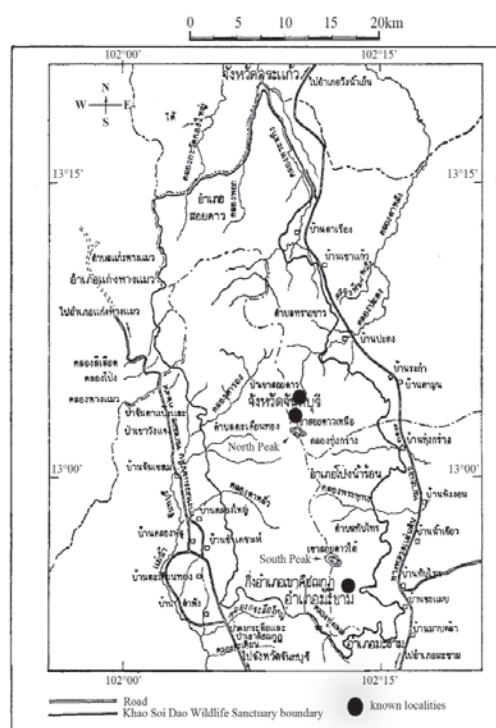
**ABSTRACT.** *Mycetia basiflora* Puff, a new species endemic to Khao Soi Dao, Chanthaburi Province, SE Thailand and known from three geographically well separated localities, is described. The species differs from all other taxa of the genus in having inflorescences at or near the base of the stems (basiflorous inflorescences). This is the first record of that condition in the Rubiaceae. The genus also has species with cauliflorous inflorescences (3 of these also occurring in Thailand); the here described new discovery thus makes *Mycetia* the only known genus in the Rubiaceae with both cauli- and basiflorous taxa. Several recent collections provide evidence that the previously incompletely known and supposedly endemic *M. membranacea* is conspecific with *M. gracilis* (previously not recorded from Khao Soi Dao).

**KEY WORDS:** Rubiaceae, *Mycetia basiflora*, new species, basiflory, Thailand, Khao Soi Dao, endemic.

## **INTRODUCTION**

Thanks to Mr. Bob Harwood's thorough (and still on-going) botanical explorations, our knowledge of the plant life of Khao Soi Dao massif in Chanthaburi Province (the highest mountains in SE Thailand, and having Wildlife Sanctuary status; see Map 1) has increased dramatically. Many taxa from various plant families have been newly recorded, and several new species have been discovered in the mountains. The Rubiaceae are no exception. The present paper focuses on the genus *Mycetia*, of which three species are now recorded from Khao Soi Dao. While the status of one of them, *M. squamulosopilosa* Pitard, is undisputed, it will be shown that a supposedly endemic species, *M. membranacea* Fukuoka, is conspecific with *M. gracilis* (previously not recorded from Khao Soi Dao). Moreover, a morphologically remarkable new species will be described and documented below.

For a description of the genus *Mycetia* Reinw. (over 30 species, distributed from continental South East Asia to the Malesian region, 12 in Thailand) see Puff et al. (2005: 136). An up-to-date key can be found on the Flora of Thailand: Rubiaceae website ([http://homepage.univie.ac.at/christian.puff/FTH-RUB/FTH-RUB\\_HOME.htm](http://homepage.univie.ac.at/christian.puff/FTH-RUB/FTH-RUB_HOME.htm)).



Map 1. Known distribution of *Mycetia basiflora* in the Khao Soi Dao Wildlife Sanctuary.

<sup>1</sup> Faculty Center of Biodiversity (formerly Institute of Botany), University of Vienna, Rennweg 14, A-1030 Vienna, Austria. email: Christian.Puff@univie.ac.at

# I. NEW SPECIES

***Mycetia basiflora* Puff, sp. nov.**, ab omnibus speciebus *Mycetiae* inflorescentiis basifloris differt. Type: Thailand, Chanthaburi, Khao Soi Dao Nuea, 2 Jan. 2009, *Harwood* 2038 (holotype **BKF**; isotypes to be distributed). Figs 1 & 2.

Shrub to ca 1 m tall, with one to several, little- or unbranched erect stems and often some runner-like stems originating near the woody base; stems to 15 mm in diam. near base; young parts minutely puberulous, soon becoming glabrous; bark on older parts shiny pale grey to whitish. Leaves isophyllous to indistinctly anisophyllous, membranous-chartaceous, lanceolate, ovate- or obovate-lanceolate, 12–26 by 5–12 cm, base attenuate, apex acute, discolourous (paler green below), glabrous above, sometimes soft hairy below; ca 15–17 pairs of prominent lateral veins; petioles 15–30 mm long, puberulous; stipules ovate-lanceolate, 4–7 by 3–6 mm, puberulous on the outside. Inflorescences basiflorous, usually in groups of several (to many) at or near the base of the stems (rarely more than 10 cm away from the ground), on peduncles to 7 cm long (short hairy at least when young, often becoming elongated and slightly woody in fruit); rather condensed and many-flowered, subglobose to cylindrical; bracts small, (linear-)lanceolate; pedicels 1–4 mm long (slightly elongated in fruit), hairy. Flowers 5-merous, heterodistylous, actinomorphic to indistinctly zygomorphic (due to slightly curved corolla tube). Calyx lobes narrowly triangular to linear-lanceolate, 4–8 by 1–2 mm, short hairy on the outside. Corolla yellow at first, turning whitish with age, tube short hairy out- and inside, slightly swollen at base, 10–14 mm long; lobes 2–4 mm long, glabrous, recurved, obtuse. Stamens subsessile, either inserted below throat (short-styled morph) or near the base of tube (long-styled morph), anthers ca 2–3 mm long. Ovary 2-celled, (each locule with numerous ovules on a peltate placenta attached to the septum), beset with short straight hairs, ca 1.5–2.5 mm high, crowned by a ring-like nectariferous disc; style to 12 mm long in long-styled morph, to only ca 7 mm in short-styled morph; stigma lobes 3–5 mm long, at least partially exerted from throat in long-styled morphs, included in short-styles

morphs. Fruit short hairy when young but glabrous and white when fully mature (turning pale purplish when very old), globose to somewhat ovoid, ca 7–10 mm in diam. (considerably larger and soft and watery when fresh), crowned by persistent, often inward-bent calyx lobes. Seeds numerous, very small, shiny black.

Thailand.— SOUTHEASTERN: Chanthaburi [Khao Soi Dao Wildlife Sanctuary, northern part, *Harwood* 2038 (**BKF**) & *Harwood* 2039 (**BKF**), southern part, *Puff* 090102-2/1 (WU – spirit collection only); detailed locality descriptions below].

Distribution (Map 1).— Known only from Khao Soi Dao (KSD). Recorded from both the North and South Peak area (KSD Nuea = KSD North and KSD Tai = KSD South); the former has two known localities, the latter only one. The “northern” localities are ca 2 km apart. The first [holotype locality; Fig. 1C, D] is above “Level 16” of KSD waterfall, at 650–700 m. The second [Fig. 2A–B, E–G] is higher up the mountain, at ca 1000 m, on the trail to KSD North Peak. The “southern” locality (separated by a distance of over 15 km straight line from the “northern” localities) is some distance off the trail from Pong Nam Ron to an unnamed waterfall (and, eventually to KSD South Peak), along a creek near a cardamom farm, at ca 600 m [Fig. 1A–B; Fig. 2C–D]. Additional plants found some distance further upstream (at ca 1000 m) suggests that the population extends for some kilometers along this stream. It is very likely that more localities will be discovered in the vast area between KSD North and South Peak, but so far no botanist has ever set foot in this region.

Ecology.—All known populations grow in damp, shady ground in the vicinity of streams or small watercourses, in evergreen forest at altitudes as above. Flowers: May–July. Fruits: July–November (January).

Notes.— 1) Type selection. The holotype contains a vegetative leafy shoot and the woody base of a plant with numerous remnants of inflorescences, some still bearing old fruits (see Fig. 1C, which was taken before the specimen was collected). The collection *Harwood* 2039 (= syntype) [from 1000 m, May 14, 2009; both herbarium specimen and spirit collection in **BKF**] includes good



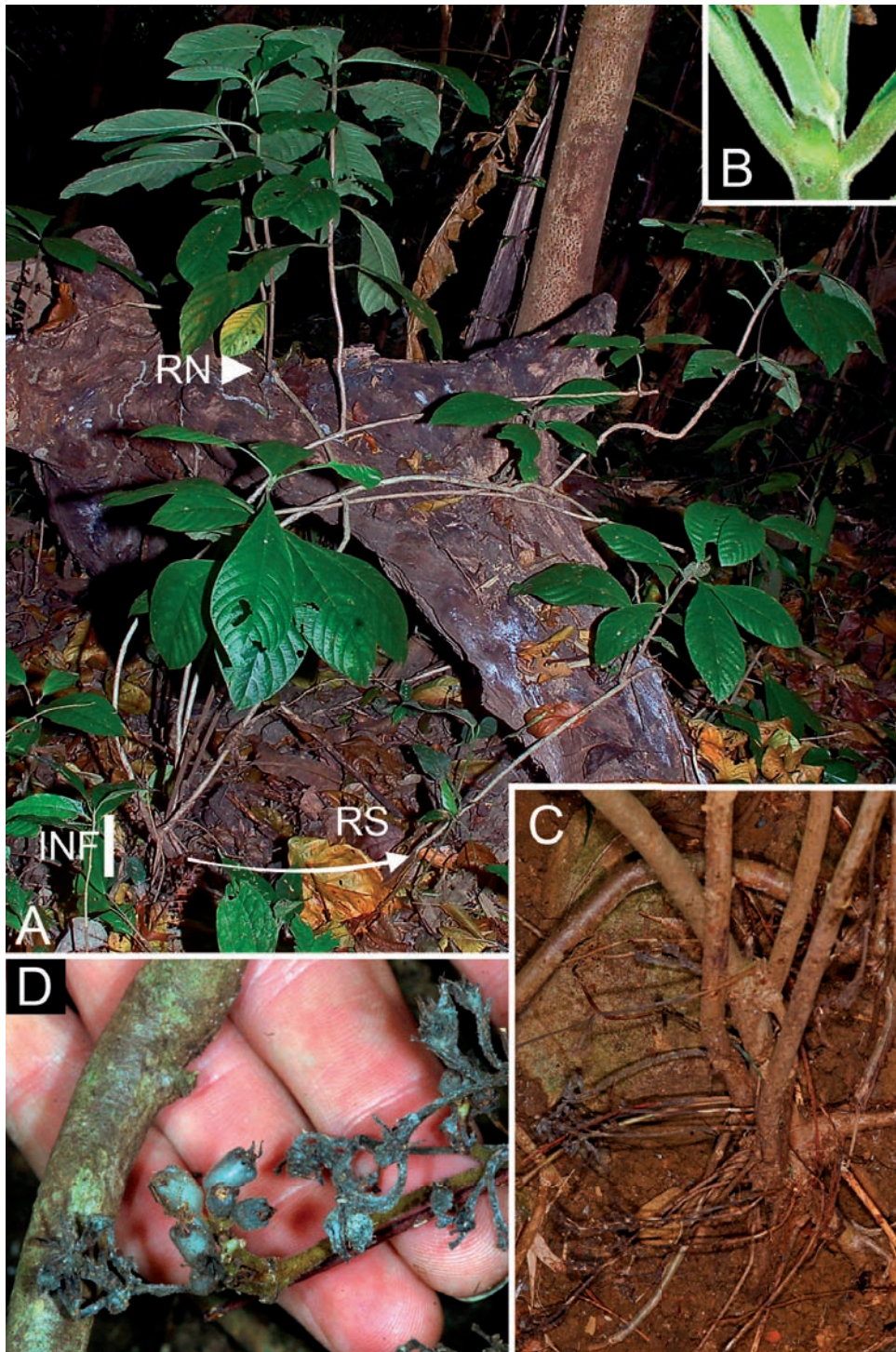


Figure 1. *Mycetia basiflora*. A. habit (INF, area of inflorescences, see B for detail; RS, runner-like shoot; RN, stem rooting at node and producing orthotropic shoots); B. stipules; C. base of stems showing numerous remnants of old inflorescences obviously produced over several growing seasons (partly with old fruits, partly only inflorescence axes left); D. detail of old inflorescence with fruits. Photographs C. Puff, Jan 2009.



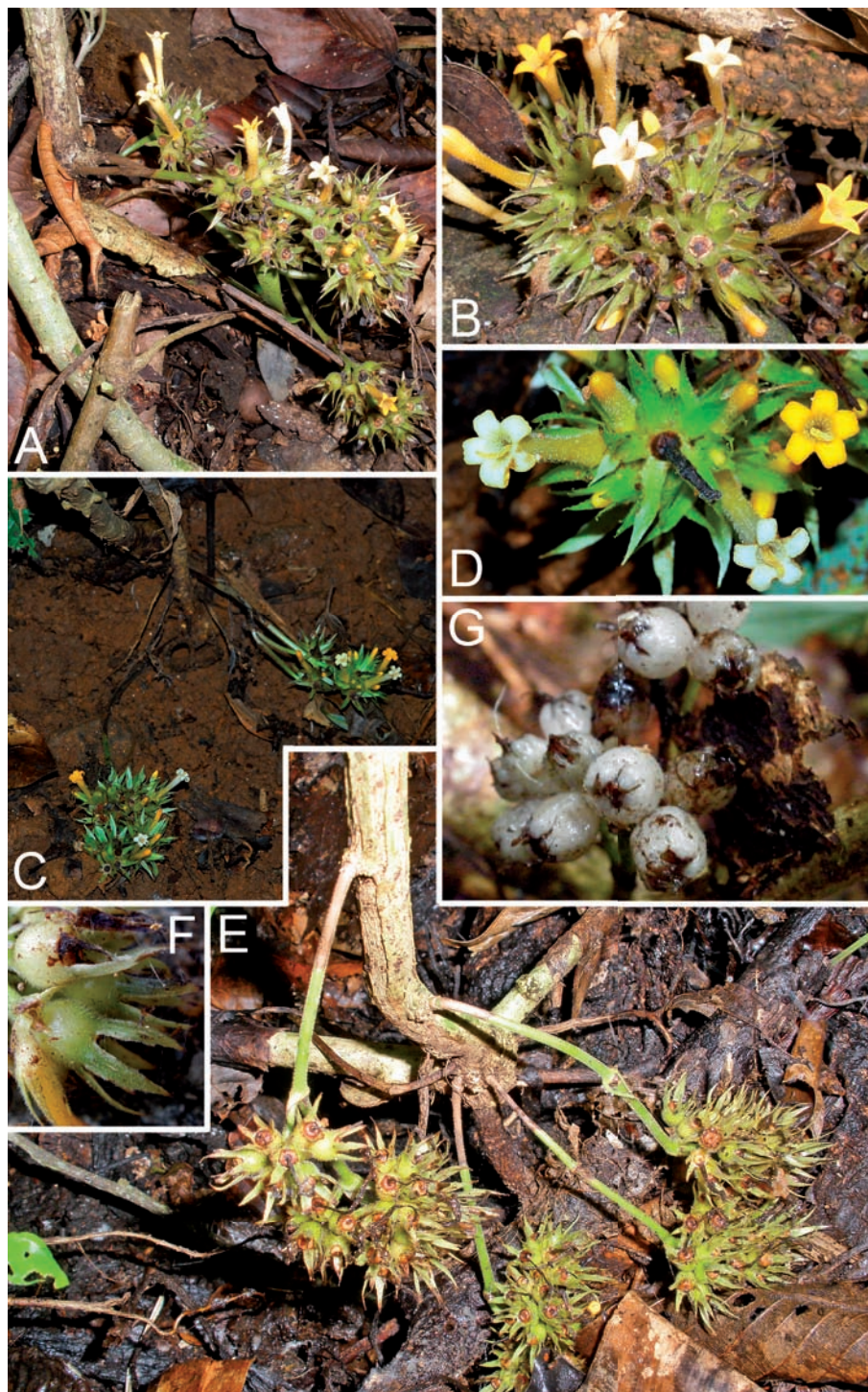


Figure 2. *Mycetia basiflora*. A, C. flowering inflorescences; B, D. details (B. short-styled, D. long-styled morph); E. fruiting inflorescence (fruits immature; F. detail); G. mature fruits. Photographs Bob Harwood, except C-D (Phongsak Phonsena); A-F. June – July 2008; G. Oct. 2008.

flowering material on loose inflorescences detached from the base of the stem. As the inflorescences are detached, there is no clue to where they are actually from; for this reason it was decided not to select this collection as holotype.

2) Growth form. The growth form of the new species does not entirely fit any “conventional” category (moreover, it is – as far as it is known from field observations – deviating from all other *Mycetia* spp.). The basal, rootstock-like woody part usually produces several erect or suberect stems which eventually become woody. In addition, usually few to several runner-like stems originate at the basal woody area as well. The latter either grow underground (normally in a depth of not more than a few cm; Fig. 1A: RS), on the soil surface and covered by litter, or above ground. The runner-like stems sometimes root at nodes and at certain nodes new erect shoots are produced (Fig. 1A: RN). It appears that runner-like stems and orthotropic shoots borne on them eventually lose contact with the “mother individual.” This explains why plants are always seen in moderately large “clumps” (or more precisely clones) in the field.

3) Basiflory – Cauliflory. By definition, basiflory is a specialized form of cauliflory, i.e., the displacement of inflorescences from the upper part of the stem/trunk to its base. Thus it is not surprising that a number of dicot taxa have species with cauliflorous and basiflorous inflorescences [and sometimes also ramiflorous inflorescences (borne on leafless, woody lateral branches) and “normal” inflorescences in foliage leaf axils]. A random example is *Polyalthia* (Annonaceae; basiflory being more uncommon; Borneo, obs. C Puff and photographic documentation). Up to now, no Rubiaceae genera have been known to exhibit both phenomena.

Compared to other families centred in the tropics, cauliflory is rather uncommon in the Rubiaceae and restricted to few taxa. In addition to the taxa listed by Robbrecht (1988:68), the following can be added here: *Captaincookia margaretae* and *Ixora cauliflora* (both New Caledonian endemics, the former monotypic; Hallé 1973, plate 1.1, 2.4. and 5); *Praravinia suberosa*\* and *Stichianthus minutiflorus*\* (Bornean endemics; in the latter inflorescence in rows); species of the neotropical genus *Hoffmannia*\* [taxa marked with \*:

photographic documentation in the website of the author ([http://homepage.univie.ac.at/christian.puff/Rub\\_pics.htm](http://homepage.univie.ac.at/christian.puff/Rub_pics.htm))]; *Mycetia* spp.

Three Thai *Mycetia* species can have cauliflorous inflorescences, but only in one, *M. fasciculata*, is cauliflory obligatory. In the other two, *M. cauliflora* (illustration: Puff et al. 2005: pl. 3.1.46A-B) and *M. gracilis*, there are sometimes also lax, terminal thyrsic inflorescences in addition to those borne on the leafless stems. Two of these, *M. cauliflora* and *M. fasciculata*, occur from peninsular Thailand southward. The third, *M. gracilis*, a northern species extending to Upper Myanmar and Laos, is now also recorded from KSD (see further below for details).

The discovery of the here described new species with its basiflorous inflorescences (by which it is easily distinguished from all other *Mycetia* species – not only those occurring in Thailand!) makes *Mycetia* the first known and only genus in the Rubiaceae with both cauliflorous and basiflorous taxa.

The presence of basiflorous inflorescences in *M. basiflora* necessitates an amendment of the generic description of the genus (Puff et al. 2005: 136) to include this situation: ... inflorescences terminal (common), cauliflorous and often paired at leafless nodes (less common), or basiflorous (rare) ...

Further note on inflorescences: The presence of several to many inflorescence remnants of obviously different ages (only peduncles left, or still bearing obviously very old fruits or with mature fruits; Fig. 1C) at the basal woody parts of the stems indicates that inflorescences are produced over several growing seasons (possibly at quite regular intervals) in the same zone of the stems.

4) Corolla color change. Corollas of the new species are yellow in bud and in younger open flowers, but as flowers age, they turn whitish (Fig. 2A–D). This agrees well with other *Mycetia* spp. (e.g. *M. glandulosa*, see Puff et al. 2005: Plate 3.1.46F). This is a remarkable situation, as in numerous other Rubiaceae corolla color change is from white (buds and young flowers) to yellow or yellow-orange (older flowers); e.g. many *Gardenia* spp.

## II. THE TRUE IDENTITY OF THE SUPPOSEDLY ENDEMIC *Mycetia membranacea* Fukuoka

The species was originally only known from two fruiting collections from Khao Soi Dao (Fukuoka 1989) and has not been recollected for many years until Mr. Harwood started his botanical exploration of the mountain. Thanks to his recent collections from several localities it is now clear that *M. membranacea* can be neither maintained as an endemic nor as a distinct species. Its character states clearly overlap with those of *M. gracilis*, a “northern” species previously not recorded from Chanthaburi. Habitats and flowering times agree well with those of northern localities.

The synonymy of *M. gracilis*, thus, is as follows:

***Mycetia gracilis*** Craib, Bull. Misc. Inform. Kew 1914: 125. 1914; Craib in Fl. Siam. 2: 80. 1932; Hutch. in C.S.Sargent, Pl. Wilson. 3: 409. 1916; Fukuoka, Acta Phytotax. Geobot. 40: 117. 1989.—*Mycetia cauliflora sensu* Craib, Bull. Misc. Inform. Kew 1911: 390. 1911, *non* Reinw.—*Mycetia cauliflora* Reinw. var. *tenuipes* Pitard in H.Lecomte, Fl. Indo-Chine 3(2): 195. 1923.—*Mycetia membranacea* Fukuoka, Acta Phytotax. Geobot. 40: 112 & fig. 1F. 1989. — Type: Chiang Mai, Doi Suthep, *Kerr* 1833 (isotype **BK!**; holotype not located ).

Thailand.—NORTHERN: Chiang Mai, Chiang Rai, Nan, Tak, Phitsanulok; NORTHEASTERN: Loei; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Chanthaburi (Khao Soi Dao, type of *M. membranacea* Fukuoka, T-23829, holotype **KYO**, isotype **BKF!**).

Distribution.— Upper Myanmar (type), Laos (type of *M. cauliflora* var. *tenuipes*), SC China.

Ecology.— Usually in damp to wet shady places in seasonal rain forest or lower montane evergreen forest. Altitude: 700–1800 m.

## ACKNOWLEDGEMENTS

Mr. Bob Harwood of Amphoe Soi Dao declined to be a co-author of this paper because he felt “I [C.P.] did all the hard work,” to put it in his own words. He discovered the here described new species during his numerous trips to KSD, drew my attention to it, provided photographs of it, kindly took me to two of the three known localities and has monitored the flowering and fruiting since 2008. He, moreover, was kind enough to critically read the manuscript. My sincere, heart-felt thanks go to him. The two photographs reproduced in Fig. 2C–D were taken by Mr. Phongsak Phonsena and given to Mr. Harwood for publication. The Forest Herbarium (BKF) is thanked for providing working facilities. Both Dr. Kongkanda Chayamarit and Mr. Chairat Chayamarit are thanked for helping to organize my trips to KSD and for providing transport.

## REFERENCES

- Fukuoka, N. (1989). Notes on the Rubiaceae from Thailand: 3. Acta Phytotaxonomica Geobotanica 40: 107–118.
- Hallé, N. (1973). *Captaincookia*, genre nouveau monotypique Néocalédonien de Rubiaceae-Ixoreae. Adansonia, sér. 2, 13: 195–202.
- Puff, C., Chayamarit, K. & Chamchumroon, V. (2005). Rubiaceae of Thailand. A pictorial guide to indigenous and cultivated genera. 1–245. The Forest Herbarium, National Park, Wildlife and Plant Conservation Department, Bangkok.
- Robbrecht, E. (1988). Tropical woody Rubiaceae. Opera Botanica Belgica 1: 1–271.