

The Rubiaceae of Ko Chang, south-eastern Thailand

VORADOL CHAMCHUMROON* & CHRISTIAN PUFF**

ABSTRACT. Ko Chang is the second largest island of Thailand. Its Rubiaceae were first treated by K. Schumann in Schmidt's *Flora of Koh Chang*. He recognised 55 species in 27 genera. Based on herbarium and field work, 64 taxa belonging to 33 genera are currently recorded. Although the numbers of taxa in Schumann's treatment and ours do not widely differ, there are major changes in status of the taxa. Eight of the 27 generic names in Schumann's treatment are no longer applicable; only 20 of the 57 taxa names are still in use. Of the 10 species newly described in the *Flora of Koh Chang*, only one is a good species; none of the new combinations have been maintained. Fifteen taxa have been newly recorded since Schumann's treatment. The relatively large proportion of rubiaceous taxa showing a Ko Chang (or general south-eastern Thailand)/peninsular Thailand disjunction is remarkable.

INTRODUCTION

Ko Chang, the second largest island of Thailand, is situated in Trat Province, in the south-eastern region of Thailand, close to the border with Cambodia (see map, Fig. 1). It is the core part of Mu Ko Chang National Park which became Thailand's 45th National Park in 1982.

The Rubiaceae, with around 100 genera and over 500 species and infrasepecific taxa, is one of the largest angiosperm families in the Flora of Thailand (Puff, unpublished). They are well represented on Ko Chang as trees, shrubs, climbers or herbs, occurring in a variety of habitats. The first treatment of the family for the island was written by Schumann (1902), at the request of J. Schmidt, editor of *Flora of Koh Chang*. Duplicates of Schmidt's collections were sent to Berlin for Schumann to work on. Although Schumann had a profound knowledge of Rubiaceae, his treatment, which recognised 55 species in 27 genera, had several shortcomings. The main reason was the fact that the Berlin Herbarium (B) lacked sufficient material from Thailand and its surroundings for comparison with the Ko Chang specimens sent to Schumann. Thus he was unable to correctly match numerous collections and subsequently (in part, unjustifiably) described several new taxa and came up with some unusual identifications (see below for details).

Work on the family subsequent to Schumann's treatment resulted in major taxonomic realignments of certain taxa. An example is the tribe Gardenieae, where all Asiatic species of *Randia* are now placed into various other genera (see below). Moreover, collecting activities during recent decades have revealed the presence of a considerable number of rubiaceous taxa not seen by Schumann. For these reasons, an

*The Forest Herbarium, National Park, Wildlife and Plant Conservation Department, Chatuchak, Bangkok 10900, Thailand.

**Institute of Botany, University of Vienna, Rennweg 14, A-1030 Vienna, Austria.

updated treatment of the Rubiaceae of Ko Chang is presented here, in which 64 taxa in 33 genera are recognised.

The present study is based both on field work in Ko Chang and on a study of collections in the following herbaria: AAU, BK, BKF, C, K, W, WU.

GEOGRAPHY AND VEGETATION OF KO CHANG

Apart from Ko Chang, Mu Ko Chang National Park (NP) includes several small to very small islands (see map, Fig. 1). They are primarily concentrated around the southern part of the main island.

Ko Chang itself, ca. 30 x 14 km, runs more or less parallel to the coast and appears very mountainous from the mainland due to the mountain ridge which runs down most of the length of the entire island. The ridge produces several summits, the tallest of which are Khao Lan, Khao Chom Prasat, Khao Khlong Mayom, Khao Salak Phet and Khao Yai. The latter, 743 m asl, is the highest peak. The rocks are mainly granitic and formed ca. 230–195 mya. The mountains tend to have rounded slopes rather than sheer cliffs.

Rainfall is very high (Trat Province has a mean annual rainfall of > 3000 mm, which is amongst the highest in Thailand; Thai Land Development Department web site, undated), and many very clear streams supply water all year round. The principal rivers of the island are Khlong Son, Khlong Mayom, Khlong Khangkhao, Khlong Bang Bao, Khlong Phrao and Khlong Nonsi.

Settlements, tourist facilities, roads, etc. are mostly concentrated in the western coastal areas, while the remainder of the island is covered by largely undisturbed, dense tropical evergreen forest. Dominant tree species include the Dipterocarpaceae namely *Dipterocarpus* spp., *Anisoptera costata* and *Hopea odorata*; *Podocarpus neriifolius* and *Croton* spp.; species of the tree-like monocots *Pandanus* and *Caryota*; various woody climbers such as *Bauhinia* spp. Numerous Zingiberaceae such as *Amomum* spp. are common in the herb layer.

Around the coastal villages of Salak Phet, Salak Khok, Khlong Son and Khlong Phrao Bay there are some ± large areas of Beach and Mangrove Forest. Dominant trees of the former include *Terminalia catappa*, *Melaleuca cajuputi*, *Syzygium grande*, *S. gratum* and *Pandanus odoratissimus*. Typical mangrove taxa include *Rhizophora mucronata*, *R. apiculata*, *Ceriops decandra*, *C. tagal*, *Bruguiera gymnorrhiza*, *B. parviflora*, *Avicennia alba*, *Xylocarpus granatum*, *X. moluccensis*, *Hibiscus tiliaceus* and *Cerbera odollam*.

RESULTS

Overview

Sixty-four taxa of Rubiaceae belonging to 33 genera are known from Ko Chang (Table 1), as compared to 57/27 in Schumann (1902). Although the numbers of taxa in Schumann's treatment and ours do not widely differ, there are major changes in status of the taxa.



Eight of the 27 generic names in Schumann's Rubiaceae treatment in *Flora of Koh Chang* (RFKC) are no longer applicable (see below for details). Only 20 of the 57 names of taxa in RFKC are still in use. However, several of them are somewhat problematic and, at present, of more or less uncertain status. Of the 10 new species described in RFKC, only one is a “good species”; four others are doubtful or incompletely known; the remaining are synonyms of other taxa. None of the new combinations published in RFKC has been maintained. A detailed account is given below.

Taxonomic changes since the *Flora of Koh Chang*

Genera that are not currently recognised are *Borreria*, *Coffea*, *Damnacanthus*, *Nauclea*, *Petunga*, *Plectronia*, *Randia* and *Stylocoryne*.

The most significant changes concern *Randia*. After it had been realized that *Randia* Houst. ex L. represented an exclusively American genus, differing from African and Asiatic *Randia* in having unisexual flowers with one-celled ovaries and pollen grains in tetrads, paleotropical taxa were re-investigated both in Africa (Keay, 1958, and many others), and tropical Asia (Tirvengadam, 1983; Wong, 1984; and others). The five taxa of *Randia* recorded from Ko Chang are now placed in four different genera (*Aidia*, *Fagerlindia*, *Oxyceros* and *Rothmannia*; see Table 1). *Randia armigera* has been transferred to *Fagerlindia* and *Randia eucodon* to *Rothmannia*. *Randia oppositiflora* (the epithet is mis-spelt as the basionym is *Webera oppositifolia*) is now considered a synonym of *Aidia densiflora* (cf. Ridsdale, 1996). The two remaining *Randia* spp. have been transferred to the genus *Oxyceros*. Whilst it is clear from the collections that *R. fasciculata* sensu Schum. (= *R. siamensis* Craib) is *O. horridus*, the correct identity of *R. longiflora* is not certain because the cited specimen could not be traced. If transferred to

Oxyceros, the latter becomes *O. longiflorus*, but Tirvengadam (1982) cautioned that *R. longiflora* has often been confused with *O. horridus*.

Plectronia, as used in RFKC, is not accepted here. The four *Plectronia* species in RFKC are now placed in three different genera. Whilst the transfer of three of the *Plectronias* to *Canthium* and *Psydrax* is merely the result of differing generic concepts within tribe Vanguerieae, *Plectronia schmidtii*, as first described in RFKC, was a mistake. As already discovered by Craib (1932), it is a member of tribe Octotropideae (formerly Hypobathreae; cf. Robbrecht, 1980, Robbrecht et al., 1993). Craib assigned it to *Petunga*, but that genus is now considered a synonym of *Hypobathrum*. *Petunga schmidtii* has not been formally transferred to *Hypobathrum*, but we refrain from making the new combination here because the genus is in need of general revision which may render the new combination unnecessary.

Canthium in Thailand is not yet revised, and the names currently used for the RFKC *Plectronia* spp. (adopted from Craib, 1932) may not hold. The status of *Plectronia siamensis*, only known from Schmidt's Ko Chang type collection, remains uncertain. It was transferred to *Canthium siamense* by Pitard (1924) but it is, as already noted by Craib (1932), very close to *C. glabrum* (see also under *Damnacanthus*, below).

Also not yet resolved (for Thailand, and for Asiatic material in general) is the generic delimitation of *Canthium*. According to Bridson (1992) *Canthium* s. str. is largely confined to Africa and only presented in Asia by a few taxa. Several *Canthium* spp. may belong to *Psydrax*, a genus re-instated by Bridson (1985). A formal transfer to *Psydrax* has only been published for *Canthium nitidum* (*Psydrax nitidum* (Craib) Wong; Wong, 1989).

The genus *Coffea* does not occur naturally in Asia (see Bridson, 1987 for a survey of its complex nomenclatural history); both *Coffea* spp. in RFKC are thus referable to other genera. *Coffea schmidtii*, first published in RFKC, is not a *Coffea* segregate but belongs to *Diplospora* (*D. schmidtii*; Craib, 1932). The latter is identical to two other wrongly identified *Diplospora* spp. (*D. malaccensis* and *D. pubescens* sensu K. Schum.).

The other species, *Coffea fragrans* sensu Schumann, is referable to *Coffea merguensis* Ridl. var. *orientalis* Craib (Craib, 1934). This, in turn, was transferred to *Paracoffea merguensis* (Ridl.) Leroy var. *orientalis* (Craib) Leroy (Leroy, 1971). This name, however, is invalid (see Bridson, 1985 for details). Later on, Leroy (in Lobreau-Callen & Leroy, 1980) validly transferred *C. merguensis* to *Psilanthus merguensis* (Ridl.) Leroy, but var. *orientalis* was forgotten so that, at present, *P. merguensis* var. *orientalis* is not validly published. Leroy's (1971) understanding of var. *orientalis* was somewhat odd. While Craib (1934) distinguished var. *merguensis* and var. *orientalis* by their leaf sizes (smaller vs. larger) and corollas (sparsely pubescent vs. glabrous on the outside), and by their geographic range (the former in southern Burma and peninsular Thailand, the latter in south-eastern Thailand), Leroy used leaf consistency, an altered set of leaf length and width differences, and an obscure difference in flowers per inflorescence (pluri- vs. pauci- or uniflorous) to distinguish the two entities. This resulted in an odd distribution pattern: Leroy's var. *merguensis* would be restricted to Burma (Tenasserim), and his var. *orientalis* would occur in peninsular and in south-eastern Thailand (according to him, it also occurs in Burma, but none of the specimens

listed originated from that country). We cannot follow Leroy's distinction of the two varieties, and at present we refrain from formally publishing infraspecific taxa within *Psilanthus merguensis* because the genus should be revised first for the Flora of Thailand area (currently, there is only a revision for India; cf. Sivarajan et al., 1992).

Nauclea has undergone marked changes in its generic delimitation, and both *Nauclea* spp. in RFKC need to be transferred to *Neonauclea*. As already noted by Craib (1932), Schumann's species identifications were erroneous, and Craib placed them under *Neonauclea calycina* which now is considered a synonym of *N. pallida* (cf. Ridsdale, 1978, 1989).

Stylocoryne (also spelled *Stylocoryna*) is now generally considered synonymous with *Tarenna*, but the status of *S. wallichii* in RFCK is not entirely certain because the specimen could not be traced by Craib (1932) or by us. The correct name for this should be *Tarenna wallichii*, but so far it has only been recorded from peninsular Thailand and the Malay Peninsula (Wong, 1989). As disjunctions between peninsular Thailand and Ko Chang (and south-eastern Thailand in general) are relatively common (see below), it is possible that the species does occur on the island.

Borreria is not generally considered a synonym of *Spermacoce*, and the weedy species recorded in RKCH becomes *S. hispida*.

Damnacanthus is a widely distributed genus, occurring from Japan westwards to China and northern India (Assam, eastern Himalaya); its geographic range passes north of Thailand. *Damnacanthus indicus*, the most widely distributed species in the genus, covers the entire area (Kanjilal et al., 1939; Lo, 1979; Yamazaki, 1987). Thus, the record of *Damnacanthus indicus* from Ko Chang, a hot and wet, strictly tropical island much outside the species' range, seems very odd. Neither Craib (1934) nor us were able to trace the specimen cited in RFKC (Schmidt 282), or any other collection of *Damnacanthus* from Thailand. The comment that the species is "frequently cultivated" also seems strange, as the spiny plant hardly makes an attractive ornamental. We are certain that it is one of the worse misnomers in RFKC. In the absence of the cited specimen, we cannot offer a definitive solution, but we have a strong suspicion that Schumann's "*Damnacanthus indicus*" might be one of the thorny *Canthium* species that was encountered in Ko Chang. The two taxa superficially resemble each other in having paired shoot thorns and clustered white flowers, and both genera have ovaries with a solitary, pendulous ovule per locule (Robbrecht et al., 1991; Li, 1963, Fig. 372). As *Canthium* s.l. (*Canthium* and *Psydrax*) is not yet revised for the *Flora of Thailand*, we are only able to identify the species as a member of the *Canthium horridum* group, characterized by paired short-shoot thorns.

The new combination *Oldenlandia costata* is to be considered a synonym of *Hedyotis venosa* (Craib, 1932). Apparently Schumann had problems with the identification of Ko Chang *Oldenlandia*. Two others were wrongly identified, as already noted by Craib (1932); see Table 1. The not entirely resolved generic delimitation between *Oldenlandia* and *Hedyotis*, has further complicated the matter.

Schumann's new species *Mussaenda lanceolata*, was, according to Craib (1932), a variety of *M. cambodiana*, "differing chiefly in the denser indumentum of branchlets and leaves". Although the genus has not yet been revised for the *Flora of Thailand*, it appears that *M. cambodiana* var. *lanceolata* (only known from Ko Chang) is not worth

retaining but should be included in the variable *M. cambodiana* (recorded mainly from south-eastern Thailand, Cambodia and Laos).

The status of the two *Lasianthus* species newly described by Schumann (*L. oligoneurus* and *L. schmidtii*) is not fully resolved. In his revision of the genus, Zhu (2001) noted that both are only known from the type collections. In particular *L. oligoneurus* is problematic as, according to Zhu, the type is incomplete, lacking fruits. Of the remaining four *Lasianthus* species in RFKC, only one, *L. lucidus*, has retained its name. *Lasianthus caloneurus* became a synonym of *L. maingayi*, and *L. cyanocarpus* is now *L. hirsutus*. *L. strigosus* Wight, for which Schumann noted that “it is supposed to be a Ceylon (species)”, and of which he claims he has also seen specimens from New Guinea, is actually *L. chevalieri*, a species restricted to south-eastern Thailand, Vietnam and Hainan Island (China) (Zhu, l.c.).

Three species of *Ophiorrhiza* are listed in RFKC, of which *O. brachycarpa* was newly described. Craib (1932) placed both other species in RFKC (*O. mungos* and *O. harrisiana*) with the former, indicating they were wrongly determined. The name *O. mungos* certainly cannot be correct; the species is restricted to southern India and Sri Lanka. *O. harrisiana* is a species widely distributed from India to Indochina and to the Malay peninsula (according to Schanzer (pers. comm), who has revised the genus for Flora of Thailand, the name *O. harrisiana* is predated by *O. rugosa*). This and *O. brachycarpa* are part of a polymorphic group of widely distributed taxa which is not yet fully resolved (Schanzer, pers. comm.). Thus the specific status of *O. brachycarpa*, is not yet certain.

The only *Urophyllum* known from Ko Chang was described in RFKC as the new species *U. schmidtii*. The species is hardly distinct from *U. blumeanum*, a species common in the forests of peninsular Thailand. A revision of Thai *Urophyllum* might well show that its status as a distinct species cannot be upheld.

The only new species described in RFKC that can be maintained appears to be *Ixora dolichophylla*, a distinct species only known from Ko Chang (the genus is currently under revision by one of us (V.C.)).

New Records

Since the publication of RFKC, a total of 15 taxa have been newly recorded from the island (see Table 1). Eleven of these are mentioned for the first time in Craib’s *Enumeratio* (Craib 1932, 1934); the others are added by us.

New records for the island include three categories of taxa are as follows:

Taxa largely restricted to the south-eastern region of Thailand (and sometimes also extending to the neighbouring parts of Cambodia). Good examples are *Argostemma pulchellum* (Sridith & Puff 2000, Fig. 7), or *Duperrea scabrida* (replaces the “northern” *D. pavettaefolia* in the Southeast; Puff, unpublished).

Taxa widely distributed in Thailand (and sometimes also in the surrounding countries). Examples are *Psychotria adenophylla* and some of the “weedy” *Hedyotis* species.

Taxa with a distinctly disjunct distribution range of south-eastern/peninsular Thailand such as *Timonius corneri* or *Uncaria cordata* (see also below).

Taxa or “species pairs” occurring both in Ko Chang (and the south-eastern region in general) and peninsular Thailand (cf. map, Fig. 2)

The relatively large number of Rubiaceae showing this kind of disjunction seems noteworthy. At present nine taxa known from Ko Chang fall into this category (*Gardenia tubifera*, *Hedyotis philippensis*, *Lasianthus constrictus* var. *latifolius*, *L. maingayi*, *Psychotria angulata*, *Psydrax nitida*, *Rennellia speciosa*: Fig. 2, *Timonius corneri*, and *Uncaria cordata*). This represents 14% of all Ko Chang Rubiaceae. In the peninsula, these taxa often reach their northern limit in Ranong Province, and mostly they extend further South to the Malay peninsula (and sometimes also to Sumatra).

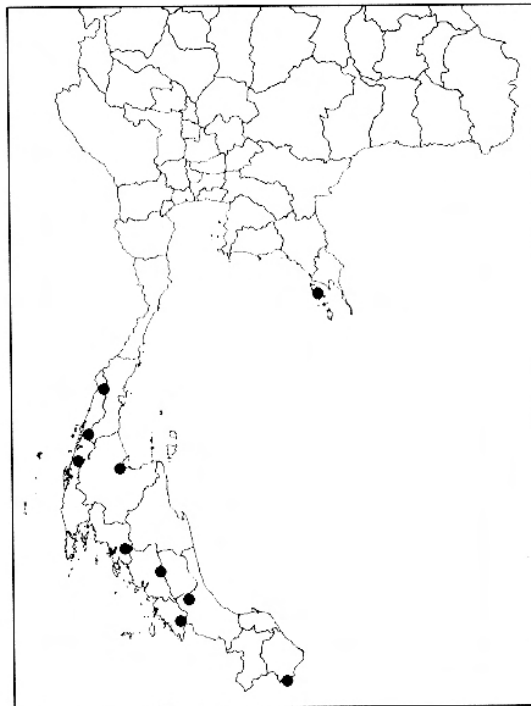


Figure 2. Distribution of *Rennellia speciosa* (based on collections in Thai herbaria).

Table 1. List of Rubiaceae in Ko Chang, Trat. Column “Name in Schumann”: to retain the name as given by Schumann (1902), wrongly applied names are indicated by the suffix “[sensu K. Schum.]” rather than by the normally used “... sensu K. Schum., non ...”. – Column “Notes and comments”: X, XX = newly recorded after Schumann’s treatment (XX = newly recorded by us). – *, ** mark taxa newly described in Schumann (1902), or new combinations, respectively.

Current name	Name in Schumann (1902)	Notes and comments
<i>Aidia densiflora</i> (Wall.) Masam.	<i>Randia oppositiflora</i> (Roxb.) K. Schum. **	**; see text
<i>Argostemma pulchellum</i> Geddes	“ <i>Argostemma</i> sp.”	X; identified to species by Craib (1932), confirmed by Sridith (1999)
<i>Canthium glabrum</i> Blume	<i>Plectronia glabra</i> (Blume) Kurz	according to Craib (1932)
<i>Canthium siamense</i> (K. Schum.) Pitard ?	<i>Plectronia siamensis</i> K. Schum. *	*; possibly not specifically distinct from <i>C. glabrum</i> ; see text
<i>Canthium</i> sp. (with thorns; <i>C. horridum</i> group; <i>Chamchumroon</i> & Puff 1157, BKF)	–	XX; see text
<i>Canthium horridum</i> group ?	<i>Damnacanthus indicus</i> Gaertn.	see text
<i>Canthium umbellatum</i> Wight	<i>Plectronia didyma</i> (Roxb.) Kurz [sensu K. Schum.] (p.p.)	according to Craib (1932); see text
<i>Chassalia curviflora</i> (Wall.) Thw.	same	
<i>Coptosapelta flavescens</i> Korth.	same	
<i>Dentella repens</i> Forst.	same	
<i>Diplospora schmidtii</i> (K. Schum.) Craib	<i>Coffea schmidtii</i> K. Schum. *; <i>Diplospora malaccensis</i> Hook. f. [sensu K. Schum.] <i>D. pubescens</i> Hook. f. [sensu K. Schum.]	*; see text
<i>Duperrea scabrida</i> Craib	–	XX
<i>Fagerlindia armigera</i> (K. Schum.) Tirveng.	<i>Randia armigera</i> K. Schum. *	*; see text
<i>Gardenia tubifera</i> Wall.	same	
<i>Guettarda speciosa</i> L.	same	
<i>Hedyotis nodiflora</i> Wall. ex. G. Don	–	X (Craib, 1932)
<i>H. philippensis</i> (Willd.) Merr. ex C.B. Robinson	–	X (Craib, 1932; as <i>H. congesta</i>)
<i>H. pinifolia</i> Wall. ex G. Don	<i>Oldenlandia pinifolia</i> (Wall. ex G. Don) O. Ktze.	
<i>H. pitardiana</i> Craib	<i>Oldenlandia mollis</i> Wall.	see Craib (1932)
<i>H. subcarnosa</i> Wall.	<i>Oldenlandia lineata</i> Roxb. (pp.)	see Craib (1932)
<i>H. venosa</i> Korth.	<i>Oldenlandia costata</i> (Roxb.) K. Schum. **	**; see Craib (1932)
<i>H. wallichii</i> Kurz	–	X (Craib, 1932)
<i>Hydnophytum formicarum</i> Jack var. <i>siamensis</i> Becc.	same	
<i>Hypobathrum schmidtii</i> [Petunga schmidtii (C.B. Clarke) Craib]	<i>Plectronia schmidtii</i> C. B. Clarke *; <i>Petunga racemosa</i> (Roxb.) K. Schum. [sensu K. Schum. 1902]	*; <i>Petunga schmidtii</i> , an older name for <i>Petunga brevispica</i> ; is not formally transferred to <i>Hypobathrum</i> ; see text
<i>Ixora coccinea</i> L.	same	
<i>I. cibdela</i> Craib	–	X (Craib 1934)
<i>I. dolichophylla</i> K. Schum. *	same	*

Table 1. (continued).

Current name	Name in Schumann (1902)	Notes and comments
<i>Ixora javanica</i> (Blume) DC.	<i>I. amoena</i> Wall.; <i>I. stricta</i> Roxb.; <i>I. stricta</i> Roxb. var. <i>blumeana</i> Hook.f.	
<i>I. kratensis</i> Craib	—	XX
<i>I. nigricans</i> R. Br. ex Wight & Arn.	same	
<i>Lasianthus chevalieri</i> Pitard	<i>Lasianthus strigosus</i> Wight [sensu K. Schum.]	see text
<i>L. chinensis</i> (Champ.) Benth.	—	XX
<i>L. constrictus</i> Wight var. <i>latifolius</i> Craib	—	X (Craib, 1934)
<i>L. hirsutus</i> (Roxb.) Merr.	<i>Lasianthus cyanocarpus</i> Jack	
<i>L. lucidus</i> Blume	same	
<i>L. maingayi</i> Hook.f.	<i>Lasianthus caloneurus</i> K. Schum. *	*
<i>L. oligoneurus</i> K. Schum. *	same	*; see text
<i>L. schmidtii</i> K. Schum. *	same	*; see text
<i>Morinda citrifolia</i> L.	same	
<i>Mussaenda cambodiana</i> Pierre ex Pitard [var. <i>lanceolata</i> (K. Schum.) Craib]	<i>Mussaenda lanceolata</i> K. Schum. *	*; see text
<i>Mycetia squamulosopilosa</i> Pitard	—	X (Craib, 1932); close to <i>M. malayana</i> ; see text
<i>Neonauclea pallida</i> (Reinw. ex Havil.) Bakh.f.	<i>Nauclea purpurea</i> (Roxb.) Merr. [sensu K. Schum.]; <i>Nauclea synkorynes</i> Korthals [sensu K. Schum.]	as <i>Neonauclea calycina</i> in Craib (1932); see text
<i>Oldenlandia diffusa</i> (Willd.) Roxb.	same	
<i>Ophiorrhiza brachycarpa</i> K. Schum. ? *	same; <i>O. harrisiana</i> Heyne [sensu K. Schum.]	*; synonymy according to Craib (1932); see text
	<i>O. mungos</i> L. [sensu K. Schum.]	
<i>Oxyceros horridus</i> Lour.	<i>Randia fasciculata</i> (Roxb.) DC. [sensu K. Schum.]	as <i>Randia siamensis</i> in Craib (1934)
<i>O. longiflorus</i> (Lam.) Yamazaki ?	<i>Randia longiflora</i> Lam.	no specimen seen; possibly <i>O. horridus</i> ; see text
<i>Psilanthus merguensis</i> (Ridl.) Leroy	<i>Coffea fragrans</i> Wall. [sensu K. Schum.]	as <i>Coffea merguensis</i> Ridl. var. <i>orientalis</i> Craib in Craib (1934); see text
<i>Psychotria adenophylla</i> Wall.	—	X (Craib, 1934)
<i>P. angulata</i> Korth.	—	X (Craib, 1934)
<i>Psychotria</i> sp. ?	<i>Psychotria fulva</i> Ham.ex Hook.f. [sensu K. Schum.]	Uncertain; no specimens seen (also not by Craib, 1932; see his note under <i>P. monticola</i> , p. 194); <i>P. fulva</i> does not occur in Thailand
<i>P. rubra</i> Poir.	<i>Psychotria jackii</i> Hook.f. [sensu K. Schum.]	see Craib (1934)
<i>P. sarmentosoides</i> Val.	<i>Psychotria sarmentosa</i> Blume [sensu K. Schum.]	see Craib (1934)
<i>P. serpens</i> L.	same	
<i>Psydrax nitidum</i> (Craib) Wong	<i>Plectronia didyma</i> (Roxb.) Kurz [sensu K. Schum.] (p.p.)	as <i>Canthium nitidum</i> var. <i>suboblique</i> Craib in Craib (1932); new combination in Wong (1989)

Table 1. (continued).

Current name	Name in Schumann (1902)	Notes and comments
<i>Rennellia speciosa</i> Hook.f.	same	
<i>Rothmannia eucodon</i> (K. Schum.) Bremek.	<i>Randia eucodon</i> K. Schum. *	*
<i>Scyphiphora hydrophyllacea</i> Gaertn.	same	
<i>Spermacoce hispida</i> L.	<i>Borreria hispida</i> (L.) K. Schum.	as <i>Borreria articularis</i> in Craib (1934)
<i>Tarenna hoensis</i> Pitard	<i>Tarenna asiatica</i> O. Ktze. [sensu K. Schum.]	see Craib (1932)
<i>T. wallichii</i> (Hook. f.) Ridl. ?	<i>Stylocoryne wallichii</i> (Hook. f.) K. Schum.	specimen not seen; see text
<i>Timonius corneri</i> Wong	—	X (Craib 1932, as <i>T. wallichianus</i>); see Wong (1988)
<i>Uncaria cordata</i> (Lour.) Merr.	—	X (Craib 1932, as <i>U. sclerophylla</i>)
<i>Urophyllum longifolium</i> Hook.f.	same	
<i>U. schmidtii</i> C. B. Clarke *	same	*; possibly not distinct from <i>U. blumeum</i> ; see text

In addition, there are several closely related entities showing the same pattern, e.g. *Psilanthus merguensis* var. *merguensis* (peninsula) and “var. *orientalis*” (Ko Chang), or *Urophyllum blumeum* (peninsula) and the scarcely distinct *U. schmidtii* (Ko Chang). Other examples are *Mycetia malayana* (peninsula) and the closely allied *M. squamulosopilosa* (south-eastern Thailand and Cambodia; Fukuoka, 1989), and *Ixora brunonis* (peninsula) and *I. kratensis* (south-eastern Thailand) which, according to Chamchumroon (in prep.), may need to be combined and considered geographical subspecies. If these are added to the statistics, the link between the peninsula and south-eastern Thailand is represented by ca. 20 % of all Rubiaceae taxa recorded from Ko Chang.

Further notes

Prior to the establishment of Mu Ko Chang National Park at the end of 1982 (see above), there was negative human impact on the vegetation of Ko Chang. Settlements, farms, plantations, etc., were established in the more accessible ($\pm$ flat) coastal areas. For these reasons, some of the “classic” collecting localities visited by, for example, Schmidt and Kerr (cf. Jacobs, 1962) in the late 19th and early 20th centuries have disappeared. For instance, one of the frequently cited localities, “Klong Nonsi” (equals “Klong Munsé”), is now a populated area near the Ko Chang District Office with no traces of natural vegetation left. Examples are the type collections of *Ixora dolichophylla*, *Lasianthus oligoneuron* and *L. schmidtii*, all of which come from the Klong Nonsi area. None of these species have ever been recollected anywhere else.

ACKNOWLEDGEMENTS

Voradol Chamchumroon wishes to thank the ÖAD (Austrian Academic Exchange) for a scholarship which made it possible to carry out part of the present studies at the Institute of Botany, University of Vienna and also the Danish Scholarship

(DANCED) for support allowing Voradol Chamchumroon to visit the University of Aarhus and the Botanical Museum, Copenhagen. Mr Pramuk Thichakorn, Head of Mu Ko Chang National Park, is acknowledged for his assistance and for allowing us to work in the National Park.

REFERENCES

- Bridson, D.M. 1985. The reinstatement of *Psydrax* (Rubiaceae subfam. Cinchonoideae, tribe Vanguerieae) and a revision of the African species. *Kew Bull.* 40: 687–725.
- . 1987. Nomenclatural notes on *Psilanthus*, including *Coffea* sect. *Paracoffea* (Rubiaceae tribe Coffeae). *Kew Bull.* 42: 453–460.
- . 1992. The genus *Canthium* (Rubiaceae-Vanguerieae) in tropical Africa. *Kew Bull.* 47: 353–401.
- Craib, W.G. 1932. *Florae Siamensis enumeratio. A List of the plants known from Siam with notes of their occurrence.* Vol. 2, part 1: Caprifoliaceae & Rubiaceae (in part). 1–145. Siam Soc., Bangkok.
- . 1934. *Florae Siamensis enumeratio. A List of the plants known from Siam with notes of their occurrence.* Vol. 2, part 2: Rubiaceae (concluded) to Dipsacaceae: 147–233. Siam Soc., Bangkok.
- Fukuoka, N. 1989. Notes on the Rubiaceae from Thailand: 3. *Acta Phytotax. Geobot.* 40: 107–118.
- Holmgren, P.K., Holmgren, N.H. & Barnett, L.C. 1990. *Index Herbariorum. Part I: The herbaria of the world.* Ed. 8 [Regnum Vegetabile vol. 120]. New York Botanical Garden, Bronx, New York.
- Jacobs, M. 1962. Reliquiae Kerrianae. *Blumea* 11: 427–493.
- Kanjilal, U.N., Das, A., Kanjilal, P.C. & De, R.N. 1939. *Flora of Assam.* Vol. III. Caprifoliaceae to Plantaginaceae: 1–578. Allied Book Center, Dehradun.
- Keay, R.W.J. 1958. *Randia* and *Gardenia* in West Africa. *Bull. Jard. Bot. Etat Bruxelles* 28: 15–72.
- Leroy, J.-F. 1971. Note sur un Caféier du Sud-Est Asiatique: *Paracoffea merguensis* (Ridl.) J.-F. Leroy. *Adansonia*, sér. 2, 11: 603–614.
- Lobreau-Callen, D. & Leroy, J.-F. 1980. Quelques données palynologiques sur le genre *Coffea* et autre genres du cercle de Caféiers. *Ass. Sc. Intern. Café. 9^e Colloque*, Londres: 250–251.
- Li, H.-L. 1963. *Woody flora of Taiwan.* Narberth, Livingston. 974 p.
- Lo, H.-S. 1979. A revision of the genus *Damnacanthus* Gaertn.f. from China [in Chinese]. *Acta Phytotax. Sinica* 17: 104–109.
- Pitard, J. 1924. Rubiaceae (suite). In: Lecomte, M.H. (eds), *Flore générale de l'Indo-Chine*, vol. 3, fasc. 3: 289–432. Masson, Paris.

- Ridsdale, C.E. 1978. A revision of the tribe Naucleae s.s. *Blumea* 24: 307–366.
- _____. 1989. A revision of *Neonauclea*. *Blumea* 34: 177–275.
- _____. 1996. A review of *Aidia* s.l. (Rubiaceae) in Southeast Asia and Malesia. *Blumea* 41: 135–179.
- Robbrecht, E. 1980. The Hypobathreae (Rubiaceae-Ixoroideae). 1. Delimitation and division of a new tribe. *Bull. Jard. Bot. Nat. Belg.* 50: 69–77.
- Robbrecht, E., Puff, C. & Igersheim, A. 1991. The genera *Mitchella* and *Damnacanthus*. Evidence for their close alliance; comments on the campylotropy in the Rubiaceae and the circumscription of the Morindeae. *Blumea* 35: 307–345.
- Robbrecht, E., Bridson, D.M. & Deb, D.B. 1993. The South Indian genus *Octotropis* (Rubiaceae). An investigation of its characters and reinstatement of the tribal name Octotropideae. In: Robbrecht, E. (ed.), *Advances in Rubiaceae Macrosystematics*. *Op. Bot. Belg.* 6: 81–92.
- Schumann, K. 1902. Rubiaceae. In: Schmidt, J. (ed.), *Flora of Koh Chang. Contributions to the knowledge of the vegetation in the Gulf of Siam*. *Bot. Tidsskr.* 24: 329–341.
- Sivarajan, V.V., Biju, S.D. & Mathew, P. 1992. Revision of the genus *Psilanthus* Hook. f. (Rubiaceae tribe Coffeae) in India. *Bot. Bull. Acad. Sinica (Taiwan)* 33: 209–224.
- Sridith, K. 1999. A synopsis of the genus *Argostemma* Wall. (Rubiaceae) in Thailand. *Thai For. Bull. (Bot.)* 27: 86–137.
- Sridith, K. & Puff, C. 2000. Distribution of *Argostemma* Wall. (Rubiaceae), with special reference to Thailand and surrounding areas. *Thai For. Bull. (Bot.)* 28: 123–138.
- Tirvengadam, D.D. 1982. A study of the tribe Gardenieae (Rubiaceae) of South and South East Asia. Generic delimitation and revision with enumeration of species. 1–176. Thesis Licent. Sci (unpubl.), Aarhus.
- _____. 1983. New taxa and name changes in tropical Asiatic Rubiaceae. *Nordic J. Bot.* 3: 455–469.
- Wong, K.M. 1984. The genera of Peninsular Malaysian Rubiaceae formerly confused with *Randia*. *Malay. Nature J.* 38: 1–57.
- _____. 1988. The Antirheoideae (Rubiaceae) of the Malay Peninsula. *Kew Bull.* 43: 491–518.
- _____. 1989. Rubiaceae. In: Ng, F.S.P. (ed.), *Tree flora of Malaya* 4: 324–425. Longman Malaysia, Petaling Jaya.
- Yamazaki, T. 1987. The genus *Damnacanthus* in Japan, Korea and Taiwan [in Japanese]. *J. Phytogeogr. Taxon.* 35: 69–74.
- Zhu, H. 2001. A taxonomic revision of the genus *Lasianthus* Jack (Rubiaceae) from Thailand. *Acta Phytotax. Sinica*: 116–150.

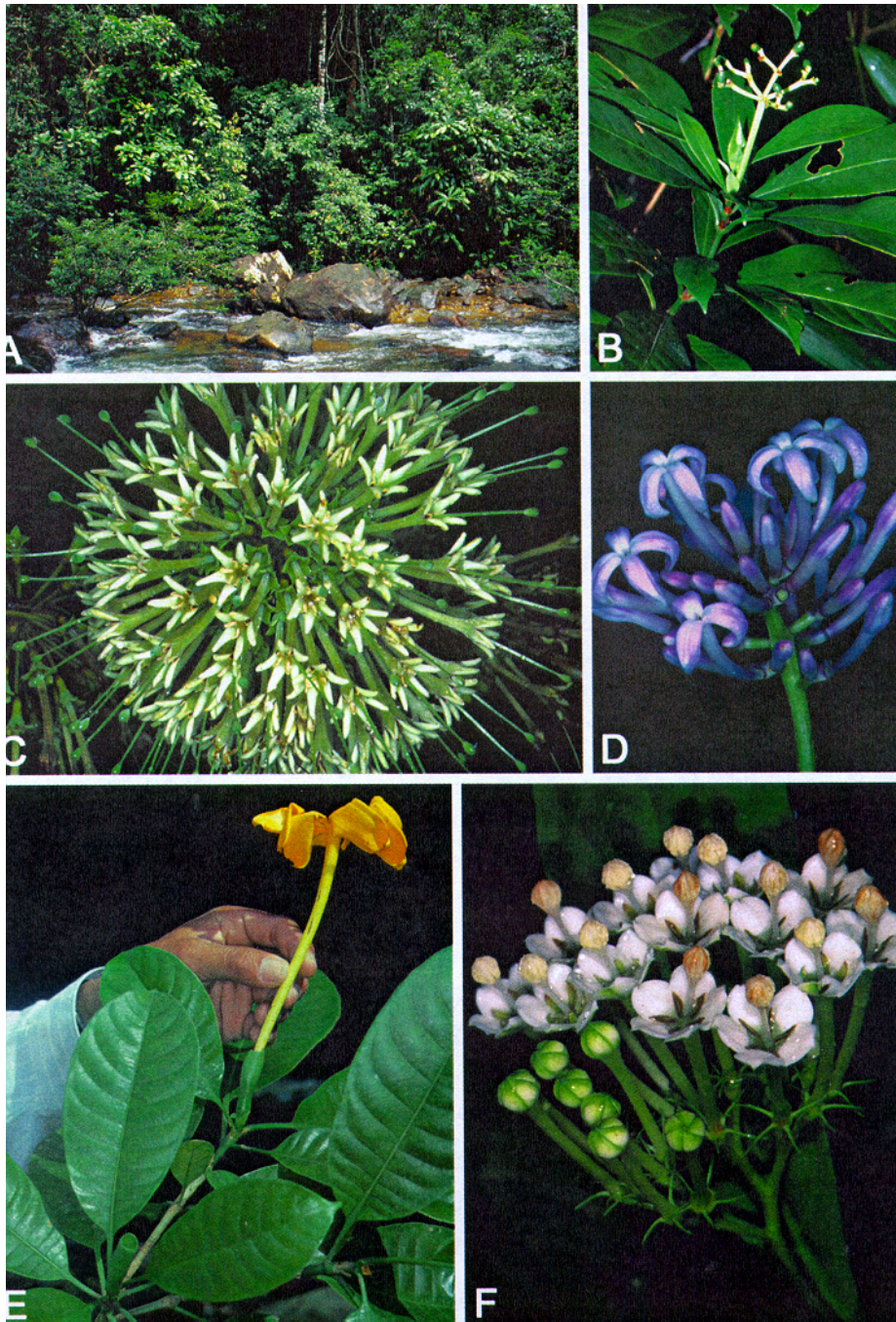


Figure 3. A. Ko Chang, near Than Mayom waterfall. B-F. Rubiaceae recorded from Ko Chang; B. *Psychotria angulata*; C. *Uncaria cordata*; D. *Rennellia speciosa*; E. *Gardenia tubifera*; F. *Duperrea scabrida* (Photographed by C. Puff).