

## A synopsis of *Mussaenda* L. (Rubiaceae) in Thailand

PRANOM CHANTARANTHAI<sup>1</sup>

**ABSTRACT.** A synopsis of the 17 *Mussaenda* species occurring in Thailand is presented, one of which, *M. garrettii* Craib is endemic to Thailand. *Mussaenda cambodiana* Pierre ex Pit. var. *lanceolata* Craib, *M. longisepala* Geddes, *M. glabra* Vahl var. *puberula* King, *M. mollis* Geddes, *M. oblonga* King and *M. villosa* Wall. ex G. Don var. *herveyana* King are reduced to synonymy under *M. sanderiana* Ridl., *M. angustisepala* Ridl., *M. glabra* Vahl, *M. wrayi* King, *M. wallichii* G. Don and *M. villosa*, respectively. Two species, *Mussaenda erythrophylla* Schumacher & Thonn. and *M. philippica* A. Rich, are introduced ornamental plants in Thailand. *Mussaenda kerrii* Craib is newly recorded for Myanmar. Lectotypes for *Mussaenda angustisepala*, *M. calycina* Wall. ex G. Don, *M. cambodiana*, *M. cambodiana* var. *annamensis* Pit., *M. cordifolia* Wall. ex G. Don, *M. cuspidata* Geddes, *M. ferrea* Geddes, *M. garrettii*, *M. glabra* var. *puberula*, *M. kerrii*, *M. longisepala*, *M. mollis*, *M. oblonga*, *M. parva* Wall. ex G. Don, *M. sootepensis* Craib, *M. sutepensis* Hosseus, *M. theifera* Pierre ex Pit., *M. theifera* var. *laotica* Pit., *M. uniflora* Wall. ex G. Don, *M. variolosa* Wall. ex G. Don, *M. villosa*, *M. wallichii* and *M. wrayi* are also selected. A generic description, a key to the species, nomenclature, vernacular names, distributional data and specimens examined are presented.

**KEY WORDS:** *Mussaenda*, Rubiaceae, Thailand.

### INTRODUCTION

*Mussaenda* L. is a genus in the Old World tropics and Australia. It is distributed from Africa through India, SE Asia and Australia, with some 160 species (Mabberley, 2008). Some species are cultivated as ornamentals. Most species are widespread along roadsides or the margins of deciduous, mixed deciduous, dry and evergreen forests, or in open scrub. The enlarged white to creamy-white calycophylls (petal- or leaf-like calyx lobes) (exceptionally absent in two species formerly placed in *Aphaenandra* Miq.), with an orange to yellow, or rarely red, funnel-shaped corolla, and usually bifid interpetiolar stipules, are the distinguishing characters of the genus. An analysis of *rbcL* sequence data led to the reestablishment of the tribe Mussaendeae (Bremer & Thulin, 1998). Mussaendeae, currently belonging to the subfamily Ixoroideae *s.l.* (Bremer *et al.* 1999), formerly comprised seven genera (Bremer & Thulin, 1998), viz. *Aphaenandra*, *Heinsia* DC., *Landiopsis* Capuron ex Bosser, *Mussaenda* Burm. ex L. *s.l.*, *Neomussaenda* Tange, *Pseudomussaenda* Wernham and *Schizomussaenda* H.L.Li. From a

more recent molecular phylogenetic study, based on ITS and *trnT-F* sequence data, *Aphaenandra* is now treated as a synonym of *Mussaenda* (Alejandro *et al.*, 2005).

The first checklist of Thai species, by Craib (1932), included 19 taxa. Seventeen species are enumerated in this paper, including two introduced species, preceded by a key to the species. Specimen data for each taxon is also provided for reference. The purpose of this paper is to provide a synopsis of Thai species of *Mussaenda* which will serve as a basis for the treatment of the genus for the forthcoming Flora of Thailand account.

*Mussaenda* is similar to *Schizomussaenda*, which is known from Northern and Southeastern Thailand, in one flower of a cluster typically being an expanded petaloid calyx lobe (calycophyll). The most obvious distinguishing characters are that in *Mussaenda* the species are subshrubs or scandent shrubs and the fruit is berry-like, whereas in *Schizomussaenda* the species are trees and the fruit is capsular.

<sup>1</sup> Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Khon Kaen 40002 & Center of Excellence on Biodiversity (BDC), Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand

## MATERIALS AND METHODS

This study is largely based on the specimens kept at the following herbaria; AAU, BCU, BK, BKF, BM, BO, C, CMU, K, KKU, L, P, PSU, SING and TCD (Thiers, 2014). Field observations have also been made. Nearly all specimens cited here have been seen, those that have not been seen are indicated by *n.v.*

## MUSSAENDA

L., Sp. Pl: 177. 1753. Type species: *Mussaenda frondosa* L.

*Belilla* Adans., Fam. Pl. 2: 159. 1753. Based on “*Mussaenda* Burm., Zeyl. 1: 76”, i.e., not L., and “H.M. 2 t. 18” (presumably *Hortus Malabaricus*); no species named so no type designated.

*Aphaenandra* Miq., Ann. Mus. Bot. Lugd.-Bat. 4: 128. 1869. Type species: *Aphaenandra sumatrana* Miq. (= *Mussaenda uniflora* Wall. ex G.Don).

*Asemanthia* Ridl., Bull. Misc. Inform. Kew 1939: 599. 1939. Type species: *Asemanthia coccinea* (Stapf) Ridl. (= *Mussaenda nadirianum* ined.).

Erect or scandent shrubs, or climbers, rarely subshrubs with short prostrate or creeping stems. *Leaves* opposite; interpetiolar stipules persistent or

caducous, usually bifid. *Inflorescence* terminal or both terminal and in the upper leaf axils, cymose, paniculate or thyrsiform; branching from the base; bracts and bracteoles caducous. *Flowers* sessile or pedicellate, bisexual and usually distylous or rarely unisexual. *Calyx*: tube oblong or narrowly turbinate; lobes 5, elliptic, lanceolate, triangular or spine-like, with one (rarely all) enlarged petiolate and petaloid (stipitate calycophyll/s), with 5–9 longitudinal veins, white or coloured, persistent or caducous. *Corolla* yellow or orange, rarely red, salverform; tube usually slender then abruptly inflated around anthers, inside variously pubescent but usually densely yellow clavate villous in throat; lobes 5, valvate-reduplicate in bud, often long acuminate. *Stamens* 5, inserted in middle to upper part of corolla tube, included; filaments short or reduced; anthers basifixed. *Ovary* 2-locular, ovule numerous in each locule; stigma 2-lobed, linear, included or exerted. *Fruit* ripening purple to black, a berry, fleshy, globose to ellipsoid, often conspicuously lenticellate, crowned by the scar of calyx lobes. *Seeds* numerous, small angled to flattened.

About 160 species; widespread in tropical Africa, Asia and Australia. Seventeen species in Thailand, including two introduced species.

## KEY TO THE SPECIES

1. Subshrub with short prostrate or creeping stem; calycophyll absent or rarely present
  2. Corolla lobes 4–7 mm long and one third to one fourth the length of the tube **9. *M. parva***
  2. Corolla lobes ca. 10 mm long and half as long as the tube **13. *M. uniflora***
1. Scandent shrub or undershrub; calycophyll present
  3. All calyx lobes petaloid (i.e. calycophylls)
    4. Calycophylls oblanceolate or oblong-lanceolate, hairy only on the veins; native **5. *M. garrettii***
    4. Calycophylls ovate or broadly ovate, hairy all over the lamina; introduced **10. *M. philippica***
  3. One of the calyx lobes petaloid (i.e. one calycophyll)
    5. Calycophyll red **4. *M. erythrophylla***
    5. Calycophyll white or yellowish white
      6. Calyx lobes elliptic or oblanceolate
        7. Calyx densely pilose; corolla tube less than 2 cm long **17. *M. wrayi***
        7. Calyx sparsely hairy; corolla tube more than 2 cm long
          8. Calyx lobes more than 1 cm long **8. *M. macrophylla***
          8. Calyx lobes less than 1 cm long **1. *M. angustisepala***
      6. Calyx lobes triangular or spine-like
        9. Calyx lobes longer than calyx tube
          10. Leaves soft-hairy; inflorescences both terminal and in the upper leaf axils; calyx lobes more than 7 mm long **15. *M. villosa***
          10. Leaves glabrescent, rarely densely hairy; inflorescences terminal; calyx lobes less than 7 mm long **2. *M. cambodiana***
  9. Calyx lobes shorter than calyx tube
    11. Leaves softly hairy

- 12. Plant covered with purple hairs
- 12. Plant not covered with purple hairs
  - 13. Leaves with densely or sparsely pilose hairs
  - 13. Leaves with strigose hairs
- 11. Leaves glabrous or nearly so
  - 14. Leaf base cordate, obtuse or rounded
  - 14. Leaf base cuneate
    - 15. Corolla glabrous or glabrescent
    - 15. Corolla densely hairy
      - 16. Calycophyll with cuspidate apex; ovary glabrous
      - 16. Calycophyll with acute or obtuse apex; ovary hairy

**11. *M. purpurascens*****12. *M. sanderiana*****14. *M. variolosa*****3. *M. cordifolia*****6. *M. glabra*****16. *M. wallichii*****7. *M. kerrii***

**1. *Mussaenda angustisepala*** Ridl., Fl. Malay Penins. 2: 60, f. 78. 1923. Type: Peninsular Malaysia, Pahang, Kwala Tembeling, 1891, *Ridley 2188* (lectotype **K** 000740943, selected here).

*Mussaenda longisepala* Geddes, Bull. Misc. Inform. Kew 1927: 171. 1927. Type: Thailand, Pattani, Bukit, 9 July 1923, *Kerr 7139* (lectotype **K** 000843194, selected here; isolectotype **BK** 257407), **syn. nov.**

Thailand.—NORTHERN: Nan [Doi Phu Kha NP, 26 June 2002, *Srisanga 2546* (**BKF**)]; Tak [5 km from Ban Musoe, 22 July 1959, *Floto 7671* (**BKF**)]; Umphang, 20 June 2005, *Pooma et al. 5331* (**BKF**); NORTH-EASTERN: Loei [Phu Ruea, Phu Luang WS, 12 Sept. 2008, *Phonsena et al. 6230* (**BKF**)]; Bueng Kan [Bung Khla, Phu Wua WS, 3 May 2002, *Pooma et al. 3428* (**BKF**)]; EASTERN: Nakhon Ratchasima [Khao Yai NP, 10 Aug. 1968, *Larsen et al. 3272* (**AAU**)]; CENTRAL: Nakhon Nayok [6 Aug. 1970, *Phengkklai et al. 3737* (**BKF**-2 sheets, **PSU**)]; SOUTH-EASTERN: Sa Kaeo [Pang Sida NP, 10 Aug. 1996, *Wongprasert s.n.* (**BKF** 094312-2 sheets)]; Chon Buri [Si Racha, Khao Khiao, 22 June 1975, *Maxwell 75-603* (**AAU**, **BK**)]; *ibid.*, 27 June 1976, *Maxwell 76-409* (**AAU**, **BK**); Chanthaburi [Makham, 22 July 1977, *Na Songkhla et al. 231* (**BCU**-2 sheets)]; Ao Krathing, 24 Aug. 1992, *Dolnapha et al. 1* (**BCU**-2 sheets); Phlio waterfall, 28 May 1972, *Maxwell 72-231* (**AAU**, **BK**); PENINSULAR: Pattani [Buliat, 9 July 1923, *Kerr 7139* (**ABD**, **BK**, **BM**, **K**)]; Yala [20 Apr. 1973, *Pinnin et al. 76* (**BKF**-2 sheets, **K**)]; Narathiwat [Sungai Kolok, 26 Apr. 1931, *Lakshmakara 808* (**ABD**, **BK**, **BM**, **K**)]; Waeng, 13 Sept. 1966, *Prayad 387* (**BK**).

Distribution.—Peninsular Malaysia.

Ecology.—Scattered along the margin of evergreen forest and along river banks, 50–600 m alt.

Vernacular.—Bai tang dok (ใบต่างดอก)(Yala).

Note.—*Mussaenda angustisepala* is distinctive on account of its calyx lobes which are oblanceolate with sparse hairs and less than 1 cm long. On examination of material of the Thai species *Mussaenda longisepala* I have concluded that it should be regarded as conspecific with *M. angustisepala*. The original description of *Mussaenda angustisepala* was based on the syntypes *Dr Gimlette s.n.*, *Kunstler s.n.*, *H.N. Ridley 2188* and *L. Wray s.n.* Only *H.N. Ridley 2188* (**K**) was available for examination and, therefore, the specimen is selected here as the lectotype.

**2. *Mussaenda cambodiana*** Pierre ex Pit. in Lecomte, Fl. Indo-Chine 3: 188. 1923. Type: Cambodia, Montibus Sral, Knang-krepeu, Krewanh, 400–900 m, 1872, *Pierre 3263* (lectotype **P** 04010215, selected here; isolectotypes **P** 04010216, **P** 04010217, **P** 04010218, **P** 04010219, **P** 04010220).

*Mussaenda cambodiana* var. *annamensis* Pit. in Lecomte, Fl. Indo-Chine 3: 189. 1923. Type: Vietnam, Quang-tri, Ben-tram, 15 Mar. 1920, *Poilane 1119* (lectotype **P** 04010230, selected here). Fig. 1A.

Thailand.—CENTRAL: Bangkok [Lumpini park, 10 Sept. 1954, *Boonbrahey 5* (**BK**)]; Chatuchak, Sept. 1992, *Somprasong et al. 113* (**BK**); SOUTH-EASTERN: Chon Buri [Si Racha, 5 Apr. 1920, *Marcan 188* (**ABD**, **K**) & *Kerr 4175* (**BM**, **K**)]; *ibid.*, Khao Khiao, *Collins 646* (**ABD**, **K**) & *1947* (**ABD**, **BK**, **K**); Sattahip, 4 Apr. 1971, *Maxwell 71-289* (**AAU**, **BK**); 28 Mar. 1976, *Maxwell s.n.* (**AAU**); Chanthaburi [Makham, 26 Aug. 1966, *Larsen et al. 1847* (**AAU**, **P**)]; Soi Dao, 29 Aug. 1972, *Larsen et al. 32224* (**AAU**, **BKF**, **K**, **P**); 10 Jan. 1930, *Kerr 18048* (**ABD**, **BK**, **BM**, **K**); Trat [Huai Raeng, 22 June 1952, *Smitinand 4423* (**K**);

Mueang, 4 Jan. 1971, *Sutheesorn 1953* (**BK**); Ko Kut, Klong Chao, 3 Apr. 2002, *Phengkklai et al. 13420* (**BKF**); *ibid.*, 2 Dec. 2006, *Phengkklai et al. 15434* (**BKF**); Ko Chang, May 1920, *Vanpruk 974* (**BKF, K**); *ibid.*, Khlong Mayom, 6 Apr. 1923, *Kerr 6858A* (**ABD, BK, BM, K**); *ibid.*, Nam Tok Khlong Phlu, 4 July 2001, *Chamchumroon & Puff V.C.1170* (**BKF-2 sheets**)].

Distribution.— Cambodia, Laos, Vietnam.

Ecology.— In scrub, open savannah forest, and along margins of evergreen forest, 50–600 m alt.

Vernacular.— Hu kai (หูกี้)(Trat).

Note.— The distinguishing features of *Mussaenda cambodiana* are the spine-like calyx lobes, which are longer than the calyx tube, and the glabrous or sparsely hairy leaves. *Chamchumroon & Puff VC1170* (**BKF**) has densely or sparsely pilose leaves, similar to the leaves of *Mussaenda sanderiana* but differing from it by having calyx lobes which are longer than the calyx tube. Of the twelve different collections (*Balansa 2688* (**P** 04010226), *Bon 1608* (**P** 04010258) & *2191* (**P** 04010261), *d'Alleizette 339* (**P** 04010238), *Chevalier 32088* (**P** 04010227), *Duport 42* (**P** 04010232), *Ecole s.n. n.v.*, *Lamirié 28* (**P** 04010224), *Mouret 289* (**P** 04010221), *Pierre 3263* (**P** 04010215, **P** 04010216, **P** 04010217, **P** 04010218, **P** 04010219) & **P** 04010220), *Spire 423* (**P** 04010213), *Thorel s.n.* (**P** 04010212)) cited in the original description of *Mussaenda cambodiana*, *Pierre 3263* (**P** 04010215) is chosen as lectotype because it is well preserved and has five duplicates as isolectotypes.

Pitard (1923) described and cited syntypes of *Mussaenda cambodiana* var. *annamensis*, based on *Bauche s.n.* (**P** 04010228), *Eberhardt 1416* (**P** 04010251), *1969* (**P** 04010250), *1988* (**P** 04010209 & **P** 04010253) & *2802* (**P** 04010252), *Poilane 1119* (**P** 04010230), & *Hayata s.n. n.v. Poilane 1119* is selected here as the lectotype.

**3. *Mussaenda cordifolia*** Wall. ex G.Don, Gen. Hist. 3: 491. 1834. Type: Peninsular Malaysia, Penang, *Wallich 6260* (lectotype **K-W**, selected here).

Thailand.— PENINSULAR: Chumphon [Ban Map Amarit, 14 Jan. 1927, *Kerr 11428* (**AAU**,

**ABD, BK, BM, E, K**); Lang Suan, 21 Feb. 1927, *Kerr 12067* (**ABD, BK, BM, K**); Siep Yuan, 21 Dec. 1928, *Kerr 16249* (**ABD, BK, BM, E, K**); Tha Sae, 18 Feb. 1968, *Vacharapong 80* (**BK**); Ranong [Mueang Len, 11 Jan. 1966, *Hansen & Smitinand 11905* (**BKF**); Kra Buri, 20 Apr. 1967, *Sutheesorn 2334* (**BK**); Surat Thani [Ron Phibun, Feb. 1922, *Smith 379* (**BK**); Trang [Huai Yot, Thale Song Hong, 27 Jan. 1958, *Sørensen et al. 747* (**BKF**); Satun [Khao Keo Range, 12 Mar. 1928, *Kerr 14524* (**ABD, BK, BM, K**); Songkhla [Wan Yai, 25 Mar. 1928, *Kerr 14773* (**ABD-2 sheets, BK, BM, K**); Hat Yai, 27 Jan. 1979, *Hamilton & Congdon 227* (**AAU, BCU**); 2 Dec. 1955, *Umpai 178* (**BK**)].

Distribution.— India, Peninsular Malaysia.

Ecology.— In scrub and at margin of evergreen forest, 20–900 m alt.

Vernacular.— Tang ok (ต้างออก)(Peninsular).

Note.— The distinguishing features of *Mussaenda cordifolia* are the leaves which are glabrous or nearly so, the cordate, obtuse or rounded leaf bases, and the spine-like calyx lobes.

**4. *Mussaenda erythrophylla*** Schumach. & Thonn., Beskr. Guin. Pl.: 116. 1827. Type: Ghana, Aquapim Mt., *Thonning 93* (holotype **C n.v.**; isotype **G-DC n.v.**), fide Lorence (1999).

*Mussaenda splendida* Welw., Trans. Linn. Soc. London 27(1); 36, t. 13. 1869. Type: Angola, *Welwitsch 1116* (holotype **P** 00539362).

Thailand.— CENTRAL: Bangkok [Bang Kapi, 4 Oct. 1959, *Satayamana 4* (**BCU**); Bang Khen, 26 Nov. 1970, *Wisessankha 8* (**BCU**)].

Distribution.— Throughout tropical Africa, cultivated elsewhere (Puff *et al.*, 2005).

Ecology.— Cultivated.

Vernacular.— Khun ying arun daeng (คุณหญิงอรุณแดง), donya daeng (ดอนย่าแดง)(Bangkok); Ashanti blood, Red flag bush, Tropical dogwood.

Note.— *Mussaenda erythrophylla*, an introduced species, is readily distinguished from all other members of its genus in Thailand by its red calycophylls.

**5. *Mussaenda garrettii*** Craib, Bull. Misc. Inform. Kew 1931: 444. 1931. Type: Thailand, Chiang Mai, Doi Angka, Doi Pa Mawn spur W slope, 1460 m alt., 24 May 1928, *Garret 525* (lectotype **K**, selected here; isolectotypes **ABD**, **K**).

Thailand.— NORTHERN: Chiang Mai [Doi Inthanon, 24 May 1928, *Garret 525* (**ABD**, **K**-2 sheets)].

Distribution.— Endemic.

Ecology.— Over trees on a steep slope, 1460 m alt.

Vernacular.— Kaem khao karet (แก้มขาวการ์เร็ต).

Note.— *Mussaenda garrettii* is only known from the type collection. All calyx lobes are calyco-phylls which are oblanceolate or oblong-lanceolate with hairs only on the veins.

**6. *Mussaenda glabra*** Vahl, Symb. Bot. 3: 38. 1794. Type: East Indies, *Vahl* (lectotype **C** 10018260, selected by Jayaweera (1963)).

*Mussaenda frondosa* auct. non L.: Wallich, Numer. List 6250. 1832. Based on *Wallich 6250A* (**K-W**).

*Mussaenda penangensis* Miq., Fl. Ind. Bat. 2: 214. 1857. Type: not located, fide Jayaweera (1963).

*Mussaenda glabra* Vahl, var. 2, Hook.f., Fl. Brit. India 3: 91. 1880. Specimens not located, var. 2 fide King (1904).

*Mussaenda andersonii* Basu & Paul, J. Bombay Nat. Hist. 86(3). 430. 1990 ('1989'). Type: Sikkim, Kolwong, 9 May 1862, *Anderson 163* (holotype **CAL n.v.**), fide Wood (1999).

*Mussaenda glabra* Vahl var. *puberula* King, J. Asiat. Soc. Bengal 72: 186. 1904. Type: Singapore, *Schomburgk 43* (lectotype **K**, selected here), **syn. nov.**

Thailand.— NORTHERN: Chiang Mai [Mae Sa, 18 Sept. 1995, *Larsen et al. 46628* (**AAU**)]; Chiang Rai [Khun Korn waterfall, 24 Apr. 1991, *PK 114* (**BCU**)]; Lampang [Mae Sung, 26 June 1926, *Winit 1730* (**BK**, **K**)]; Nan [Doi Phu Kha, 11 Sept. 1995, *Larsen et al. 46365* (**AAU**)]; Na Noi, 12 Sept. 1995, *Larsen et al. 46383* (**AAU**)]; Phitsanulok [Thung Salaeng Luang, 20 July 1966, *Larsen et al. 564* (**AAU**, **BKF**)]; SOUTH-EASTERN: Chanthaburi [Soi Dao, Khao Soi Dao WS, 29 June 2001,

*Chamchumroon & Puff VC1105* (**BKF**-2 sheets)]; PENINSULAR: Ranong [Mueang Len, 2 Jan. 1966, *Hansen & Smitinand 11905* (**K**)]; Boonyaban waterfall, 26 Apr. 1967, *Sutheesorn 2430* (**BK**); *ibid.*, 6 Sept. 1984, *Fukuoka et al. T-35930* (**BKF**); *ibid.*, 8 Sept. 1984, *Fukuoka et al. T-36008* (**BKF**); near hot springs, 5 July 1992, *Larsen et al. 43128* (**AAU**, **BKF**, **P**, **PSU**); Kra Buri, 24 Aug. 1994, *Parinya & Santi 492* (**BK**); Surat Thani [Khao Sok NP, 16 Apr. 1991, *Dawson 12* (**BKF**, **K**-2 sheets)]; Phangnga [Takua Pa, Si Phangnga NP, 24 Apr. 2005, *Pooma et al. 5212* (**BKF**)]; Khura Buri, 25 May 2006, *Muadsub 86* (**BKF**); Phuket [Thalang, 20 Apr. 2006, *Gardner & Sidisunthorn ST2596* (**BKF**); *ibid.*, Khao Phra Thaeo WS, 8 Apr. 1987, *Soejerto et al. 5933* (**BKF**); Krabi [Ao Luek, 23 July 1972, *Larsen et al. 31242* (**AAU**, **BKF**); Nakhon Si Thammarat [Khao Luang NP, 17 May 1985, *Ramsri 52* (**AAU**)]; Songkhla [Hat Yai, Kho Hong Hill, 24 Aug. 1979, *Kosol 5* (**PSU**); *ibid.*, 15 Sept. 1984, *Maxwell 84-208* (**BKF**, **PSU**); *ibid.*, 21 July 1993, *Puff & Sridith 930721-1/2* (**AAU**, **PSU**); Narathiwat [Ba Cho, 12 May 1961, *Sangkhachand 146* (**BKF**, **E**, **K**-2 sheets, **P**); Sungai Padi, 15 July 1984, *Premrasmi 8* (**AAU**, **BKF**-2 sheets, **K**); Pa Wai, 3 Sept. 1987, *Niyomdham & Sriboonma 1518* (**AAU**, **BKF**-2 sheets, **K**); Waeng, 16 Aug. 1995, *Larsen et al. 45679* (**AAU**); *ibid.*, Hala Bala WS, 24 Aug. 2006, *Poopath et al. 82* (**BKF**); To Deang peat swamp forest, 17 Sept. 1997, *Niyomdham 5164* (**AAU**)].

Distribution.— India (Assam, Sikkim), Bhutan, Vietnam, Peninsular Malaysia.

Ecology.— In mixed deciduous and evergreen forests and peat swamp margins, 0–1400 m alt.

Vernacular.— Bai tang dok (ใบต่างดอก), hu kai (หูกี้)(Peninsular).

Note.— *Mussaenda glabra* is characterised by having a glabrous or glabrescent corolla, a cuneate leaf base, and triangular calyx lobes which are shorter than the calyx tube. King (1904) described *Mussaenda glabra* var. *puberula* based on many collections viz. *Walker 65* (**K**), *Anderson 77* (**K**); *Ridley 116a* (**K**), *846a n.v.* & *3651 n.v.* and *Schomburgk 43* (**K**). The last collection is well preserved and is, therefore, selected here as the lectotype.

**7. *Mussaenda kerrii*** Craib, Bull. Misc. Inform. Kew 1911: 389. 1911. Type: Thailand, Chiang Mai, Doi Sutep, 2,200 ft. alt., 14 Apr. 1910, *Kerr 1112* (lectotype **K**, selected here; isolectotype **K**). Fig. 1B.

Thailand.— NORTHERN: Chiang Mai [Chom Thong, Mae Klang Luang, 30 May 1979, *Vidal et al. 6133* (**AAU, BKF**); Doi Sutep, 6 Jan. 1962, *Nicolson 1670* (**BK, K**); *ibid.*, 1 Apr. 1984, *Maxwell 84-410* (**AAU, CMU**); *ibid.*, 10 Oct. 1987, *Maxwell 87-1144* (**AAU, CMU**); *ibid.*, 5 Dec. 1987, *Maxwell 87-1550* (**BKF, CMU**); *ibid.*, 12 Aug. 1988, *Maxwell 88-988* (**BKF, CMU**); *ibid.*, 14 Dec. 1904, *Hosseus 241* (**BM, K**); *ibid.*, 14 Apr. 1910, *Kerr 1112* (**BM, K-3 sheets**); Doi Chiang Dao WS, 27 Feb. 1957, *Kanthachai 380* (**BKF**); *ibid.*, 12 Apr. 1960, *Smitinand & Alsterlund 6619* (**BKF, K**); *ibid.*, 2 Apr. 1989, *Maxwell 89-414* (**AAU, CMU**); *ibid.*, 25 Nov. 1989, *Maxwell 89-1450* (**CMU**); Mae On, 14 Apr. 2005, *Maxwell 05-262* (**BKF**); Chiang Rai [Khun Korn waterfall, 21 May 1997, *PK 31* (**BCU**)]; Lamphun [Mae Li, 19 Apr. 1915, *Winit 206* (**BM, K**)]; Lampang [Mae Yom, 19 June 1926, *Winit 1705* (**BK, BKF, K**); Mae Ping, 6 Apr. 1930, *Winit 1948* (**K**); Wang Nua, Doi Luang NP, 24 Apr. 1997, *Maxwell 97-412* (**BKF**)]; Phrae [Apr. 1910, *Vanpruk 196* (**BKF-2 sheets, K**)]; Tak [Raheng, 22 Mar. 1915, *Winit 205* (**ABD, BM, K**)]; Doi Musoe, 24 Aug. 1961, *Chermsirivatana 58* (**BK**); NORTH-EASTERN: Loei [Phu Kradueng, 10 Apr. 1941, *Suvaenasuddhi 491* (**BKF**)]; Nakhon Phanom [Mueang, 28 July 2008, *Pooma et al. 7238* (**BKF**)]; PENINSULAR: Ranong [Mueang, Hat Som Paen, 20 Mar. 2008, *Chamchumroon et al. VC2426* (**BKF**)]; Surat Thani [Khao Sok NP, 26 Feb. 2006, *Middleton et al. 4014* (**BKF**)].

Distribution.— Myanmar.

Ecology.— Marshy ground or near stream in evergreen forest, 110–1700 m alt.

Vernacular.— Kanlapa phuek khrua (กัลปพฤกษ์เครือ)(Lampang); kambae khao (กำบ่อขาว)(Chiang Mai); tang kai khon (ตางไก่อ้น), bai tang dom (ใบตางดอก), phisuea khao (ผีเสื้อขาว)(Loei).

Note.— *Mussaenda kerrii* is distinguishable from *M. glabra* by its hairy corolla and ovary. *Maxwell's* specimens at **AAU**, nos. 75-263 & 75-267, from Tuang province, Myanmar, are the first

record of the species from Myanmar. This species was hitherto known only from Thailand, but is now seen to have a much wider range. The three sheets of the type collection, *Kerr 1112*, at **K** currently have no barcodes but the lectotype is the one that has a photocopy of the original description appended.

**8. *Mussaenda macrophylla*** Wall. in Roxb., Fl. Ind. ed. Carey 2: 228. 1824. Type: *Wallich 6250A* (holotype **K-W**).

*Mussaenda hispida* D.Don, Prodr. Fl. Nep.: 139. 1825. Type: not located, fide Jayaweera (1963).

*Mussaenda calycina* Wall. ex G.Don. Gen. Syst. 3: 489. 1834. Type: Myanmar (Burma), Mt Taong Dong and at Prome, *Wallich 6253* (lectotype **K-W**, selected here).

*Mussaenda kotoensis* Hayata, J. Coll. Sci. Univ. Tokyo 30(1): 143. 1911. Syntypes: Taiwan (Formosa), Kōtōshō, Nov. 1899, *Miyake s.n. n.v.* & year 1909, *Kusano s.n. n.v.*, fide Hua Shu, Chen Tao & C.M. Taylor (2011).

Thailand.— NORTHERN: Mae Hong Son [Mae Sariang, 8 July 1968, *Larsen et al. 2252* (**AAU, BKF, E, K, P**)]; Chiang Mai [Doi Chiang Dao WS, 29 May 1921, *Kerr 5519* (**ABD, BM, BK, E, K**); *ibid.*, 25 June 1950, *H.B.G. Garret 1318* (**K-2 sheets**)]; Tak [Mae Sot, Khao Pha Wo, 23 July 1973, *Murata et al. T-16854* (**BKF**)]; Umphang, 22 June 2005, *Pooma et al. 5406* (**BKF-2 sheets**); *ibid.*, 28 May 2011, *Pooma et al. 7055* (**BKF**)]; SOUTH-WESTERN: Uthai Thani [1 June 1991, *Santisuk et al. 675* (**BKF-2 sheets**)]; Kanchanaburi [Sai Yok, Thung Kang Yang, 5 July 1963, *Larsen 10522* (**AAU, BKF**)]; Thong Pha Phum, 5 July 1973, *Maxwell 73-112* (**AAU, BK**)]; EASTERN: Nakhon Ratchasima [Sakaerat Environmental Research Station, 11 Aug. 1989, *Puff & Ueachirakan 890811-1/7* (**BKF**)].

Distribution.— Nepal, Bhutan, Myanmar, China, Taiwan.

Ecology.— Evergreen vegetation along river, 300–800 m alt.

Vernacular.— Kaem on song si (แก้มอันสองสี) (Northern).

Note.— *Mussaenda macrophylla* has many features in common with *M. angustisepala*. It differs most obviously in its clearly longer calyx lobes.

**9. *Mussaenda parva*** Wall. ex G. Don, Gen. Syst. 3: 491. 1834.— *Aphaenandra parva* (Wall. ex G. Don) Bremek., Blumea, suppl. 1: 122. 1937. Type: Myanmar (Burma), Tavoy, *Wallich 6261* (lectotype **K-W**, selected here).

*Mussaenda sootepensis* Craib, Bull. Misc. Inform. Kew 1911: 389. 1911, non *M. sutepensis* Hosseus (1911).— *Mussaenda neosootepensis* Craib, Aberdeen Univ. Stud. 57: 103. 1912. Type: Thailand, Chiang Mai, Doi Sutep, 12 May 1910, *Kerr 1183* (lectotype **K** 000172543, selected here; isolectotypes **K** 000172543, **K** 000172546).

Thailand.— NORTHERN: Mae Hong Son [Mae Sariang, 9 July 1966, *Prayad 366* (**BK**)]; Chiang Mai [Doi Suthep, 15 June 1909, *Kerr s.n.* (**BM**); *ibid.*, 8 Aug. 1909, *Kerr 744* (**AAU**, **BM**, **BO**, **K**) & *744A* (**BM**, **K**); *ibid.*, 8 Aug. 1939, *Garret 1152* (**K**) & *1153* (**K**); Chiang Rai [Mae Suai, 2 Mar. 1989, *Bragg 53* (**CMU**); *ibid.*, *Kubiniok 365/6* (**BCU**)]; Lamphun [Mae Hat, 27 June 1915, *Winit 388* (**E**, **K**); Tak [27 June 1922, *Kerr 6166* (**ABD**, **BK**, **BM**, **K**)].

Distribution.— Myanmar (Tenasserim), Laos, Vietnam.

Ecology.— Mixed and deciduous forests, 200–2000 m alt.

Vernacular.— Kaem num (แก้มนุ่ม) (Northern).

Note.— *Mussaenda parva* is distinctive on account of its lack of calycophylls and the prostrate or creeping habit. The Thai material was recognised as the separate taxon *Mussaenda neosootepensis* but this is not distinguishable from *M. parva*. These specimens belong to *M. parva*.

**10. *Mussaenda philippica*** A. Rich, Mém. Rubiac. 165. 1830. Type: Philippines, Manila, date 1829, *G.S. Perrottet s.n.* (holotype **P** 00237778).

*Mussaenda frondosa* Blanco, Fl. Filip. 167. 1837, non L. Representative specimen: *Merrill Species Blancoanae 413* (**K** 000740974).

*Mussaenda grandiflora* Rolfe, J. Linn. Soc. 21: 311. 1884, non Benth. Type: not located, fide Govaerts (2009).

Thailand.— NORTH-EASTERN: Khon Kaen [Mueang, Khon Kaen University, 25 Oct. 2006, *Srathongjai s.n.* (**KKU**)]; CENTRAL: Bangkok [Bang Khen, 23 Feb. 1953, *Umpai 52* (**BK**); *ibid.*, Kasetsart University, 26 Nov. 1970, *Maxwell 70-68* (**BK**); Phetchaburi road, 15 Aug. 1967, *Tagawa T-7584* (**BKF**); Thon Buri, 24 June 1971, *Maxwell 70-47* (**BK**); 12 Nov. 1958, *Lersinsap 55* (**BCU**); Chulalongkorn University, 10 Aug. 2012, *Wassanathip 1* (**BCU**)]; PENINSULAR: Songkhla [Hat Yai, 28 Sept. 1979, *Somsook 103* (**PSU**); *ibid.*, 2 Oct. 1982, *Reangtip 19* (**PSU**); 19 Oct. 1980, *S.N. V3* (**PSU**)].

Distribution.— Philippines and cultivated throughout the tropics.

Ecology.— Cultivated.

Vernacular.— Donya khao (ดอนยาขาว), khun ying arun khao (คุณหญิงอรุณขาว) (Bangkok); Bangkok rose, White *Mussaenda*.

Note.— *Mussaenda philippica*, an introduced species, differs from *M. garrettii* in its ovate or broadly ovate hairy calycophylls.

**11. *Mussaenda purpurascens*** Ridl., J. Straits Branch Roy. Asiatic Soc. 61: 18. 1912. Type: Peninsular Malaysia, Selangor, Sempang Mines track, Semangkok Pass, Apr. 1911, *Ridley s.n.* (holotype **K**). Fig. 1C.

Thailand.— NORTHERN: Tak [Doi Pepo, 15 Mar. 1968, *Hansen & Smitinand 12925* (**AAU**, **BKF**, **E**, **K**)]; PENINSULAR: Ranong [Kra Buri, Ban Lam Liang, 28 Dec. 1928, *Kerr 16409* (**ABD**, **BK**, **BM**, **K**)].

Distribution.— Peninsular Malaysia.

Ecology.— In scrub and along margins of evergreen forest, 10–1380 m alt.

Vernacular.— Bai tang dok ton muang (ใบตางดอกต้นม่วง).

Note.— *Mussaenda purpurascens* is quite distinct amongst the Thai species of *Mussaenda* due to the plant being covered with purple hairs.

**12. *Mussaenda sanderiana*** Ridl., Gard. Chron. 3, ser. 3, 46: 34. 1909. Type: Laos, 1909, *Micholitz s.n.* (holotype **BM**; isotypes **SING** 0058851, **SING** 0058852).

*Mussaenda hossei* Craib, Beih. Bot. Centralbl. 28(2): 444, 457. 1911. Type: Thailand, Chiang Mai, Doi Sutep, 14 Dec. 1904, *Hosseus 242* (holotype **K**; isotype **C** 10018263).

*Mussaenda sutepensis* Hosseus, Repert. Spec. Nov. Regni Veg. 10: 62. 1911. Type: Thailand, Chiang Mai, Doi Sutep, 15 Mar. 1905, *Hosseus 447* (lectotype **K** 000740936; isotypes **B** (destroyed), **C** 10018262, **E**).

*Mussaenda ferrea* Geddes, Bull. Misc. Inform. Kew 1927: 170. 1927. Type: Thailand, Nakhon Ratchasima (Korat), Khao (Kao) Lem, 13 Mar. 1925, *Kerr 9974* (lectotype **K**, selected here; isolectotypes **ABD**, **BK**, **BM**).

*Mussaenda cuspidata* Geddes, Bull. Misc. Inform. Kew 1927: 170. 1927. Type: Thailand, Chiang Mai, Mae (Me) Kang, 1 Apr. 1925, *Winit 1310* (lectotype **K**, selected here; isolectotypes **ABD**, **BK**, **BKF**).

*Mussaenda cambodiana* Pierre ex Pit. var. *lanceolata* Craib, Fl. Siam. 2(1): 73. 1932, **syn. nov.** *Mussaenda lanceolata* K. Schum., Bot. Tidsskr. 24: 334. 1902, non Poir. nec Spreng. Type: Thailand, Trat, Ko Chang, 13 Feb. 1900, *Schmidt 521* (holotype **C** 10018259).

Thailand.—NORTHERN: Mae Hong Son [Hot, 5 Mar. 1982, *Wongprasert & Niyomdham 47* (**BKF**-2 sheets, **K**); Khun Yuam, Mae Surin waterfall, 24 Sept. 1995, *Larsen et al. 46898* (**AAU**); Pai, 8 Dec. 2007, *Srathongjai et al. W-9* (**KKU**)]; Chiang Mai [Chiang Dao, Ban Kae Noi, 25 Jan. 1964, *Hansen et al. 11047* (**BKF**, **K**); Chom Thong, Ban Sop Aep, 21 Dec. 1965, *Hennipman 3467* (**BKF**, **K**, **P**); *ibid.*, 1 Oct. 1971, *Murata et al. T-15445* (**BKF**); *ibid.*, 1 July 1979, *Vidal & Vidal 6284* (**AAU**, **BKF**); *ibid.*, Mae Soi, 8 Feb. 1991, *Maxwell 91-150* (**AAU**, **CMU**); *ibid.*, 9 May 1992, *Maxwell 92-200* (**AAU**); *ibid.*, 17 Sept. 1967, *Iwatsuki & Fukuoka T-10276* (**BKF**); Mae Chaem, 10 Feb. 1998, *Konta et al. 4196* (**BKF**); Mae Rim, 24 Feb. 1998, *Boonchai 34* (**BCU**-2 sheets); Mae Rim, Ban Nhong Hoi, 29 Aug. 2012, *Nguanchoo 391* (**BK**); Mae Taeng, 22 Oct. 1979, *Shimizu et al. T-20172* (**BKF**) & *T-20235* (**BKF**); Mueang, Khun Chang Kian, 30 July 1921, *Kerr 151* (**K**); *ibid.*, 22

Feb. 1975, *Sadakorn 496* (**BK**); Hot, Bo Luang, 19 Jan. 1964, *Hansen et al. 10777* (**BKF**, **K**, **P**); *ibid.*, 7 June 1973, *Geesink et al. 5819* (**BKF**); *ibid.*, 4 July 1968, *Larsen et al. 2079* (**AAU**, **BKF**); *ibid.*, 31 Dec 1965, *Sangkachand 178* (**K**); *ibid.*, 22 Feb. 1979, Ban Mae Sanam, *Koyama et al. T-15465* (**AAU**, **BKF**-2 sheets); *ibid.*, 6 Mar. 1989, *Santisuk 6933* (**BKF**); *ibid.*, 18 Oct. 1979, *Shimizu et al. T-19336* (**BKF**); Doi Saket, 23 May 1993, *Maxwell 73-778* (**AAU**, **BK**), 76-174 (**BK**), 93-486 (**BKF**); Om Koi, 14 Jan. 1994, *Koyama T-62197* (**BKF**); *ibid.*, 10 Jan. 1983, *Koyama et al. T-32282* (**BKF**); *ibid.*, 4 Mar. 1997, *Pooma et al. 1493* (**BKF**); *ibid.*, 20 June 1987, *Phengkklai et al. 6255* (**BKF**-2 sheets, **K**); *ibid.*, *C. Phengkklai et al. 6262* (**BKF**-2 sheets, **K**); Doi Inthanon NP, 17 Feb. 1998, *Niyomdham 5302* (**BKF**); *ibid.*, 22 July 1988, *Phengkklai et al. 6791* (**BKF**-2 sheets, **K**); *ibid.*, 10 Feb. 1998, *Phengkklai et al. 10952* (**BKF**); *ibid.*, Wachirathan waterfall, 9 Jan. 1983, *Koyama et al. T-32200* (**BKF**); *ibid.*, 1 Aug. 1988, *Tsugaru T-61795* (**BKF**); *ibid.*, 15 Sept. 1995, *Larsen et al. 46505* (**AAU**); *ibid.*, 21 July 1988, *Takahashi T-62810* (**BKF**); *ibid.*, Mae Klang drainage, 4 Feb. 1936, *Garret 1068* (**BKF**, **K**); *ibid.*, 13 Mar. 2001, *Chayamarit et al. 2464* (**BKF**-2 sheets); *ibid.*, 20 Sept. 1995, *Larsen et al. 46712* (**AAU**); *ibid.*, 11 Apr. 1953, *Suvatabhandhu 380* (**BK**); Mae Klang river, 20 July 1988, *Tamura T-60125* (**BKF**); *ibid.*, 13 Oct. 2001, *Norsaengsri & Tathana 8206* (**BKF**); *ibid.*, 1 Apr. 1925, *Winit 1310* (**ABD**, **BK**, **BKF**, **K**); Ban Yang, 17 Dec. 1965, *Tagawa et al. T-2505* (**BKF**); *ibid.*, 18 Dec. 1965, *Tagawa et al. T-2597* (**BKF**); *ibid.*, 20 July 1988, *Fukuoka T-62094* (**BKF**), *T-62100* (**BKF**) & *T-62102* (**BKF**); *ibid.*, 23 July 1988, *Fukuoka T-62146* (**BKF**) & *T-62188* (**BKF**); *ibid.*, 25 July 1988, *Fukuoka T-62220* (**BKF**) & *T-62247* (**BKF**); *ibid.*, Mae Klang Phat, 5 Aug. 1988, *Fukuoka T-62522* (**BKF**); *ibid.*, Doi Ang Ka, 23 Apr. 1931, *Put 3741* (**ABD**, **BK**, **BM**, **E**, **K**); *ibid.*, 17 Apr. 1970, *Worawut 76* (**BKF**); *ibid.*, 18 Feb. 1979, *Koyama et al. T-15439* (**AAU**, **BKF**-2 sheets); Doi Suthep-Pui NP, 14 Feb. 1904, *Hosseus 242* (**C**, **K**); *ibid.*, 18 Aug. 1921, *Kerr 261* (**K**), 270 (**K**) & 292 (**K**); *ibid.*, 15 Mar. 1905, *Hosseus 447* (**C**, **E**, **K**); *ibid.*, 16 Jan. 1910, *Kerr 936* (**BM**, **K**-2 sheets), 936A (**BM**, **K**); *ibid.*, 12 May 1910, *Kerr 1183* (**BM**, **K**-3 sheets); *ibid.*, 1 Mar. 1951, *Garret 1343* (**K**); 21 May 1951, *Smitinand 155* (**BKF**); *ibid.*, 2 Mar. 1966, *Sukkri*



- 47 (**BKF**); *ibid.*, 2 Mar. 1966, *Chermsirivatana 415 (BK) & 415A (BK)*; *ibid.*, Apr. 1931, *Cunniff s.n. (ABD, K)*; *ibid.*, 8 Feb. 1958, *Sørensen et al. 870 (BKF)*; *ibid.*, 15 Apr. 1958, *Sørensen et al. 2755 (BKF)*; *ibid.*, 3 May 1958, *Sørensen et al. 3225 (BKF)*; *ibid.*, 24 Jan 1964, *Noimao s.n. (BK-SN220626)*; *ibid.*, 8 Sept. 1967, *Iwatsuki et al. T-9423 (BKF)*; *ibid.*, 9 Sept. 1967, *Tagawa et al. T-9497 (BKF)*; *ibid.*, 14 July 1988, *Koyama T-61907 (BKF)*; *ibid.*, 21 Feb. 1992, *Maxwell 92-64 (AAU)*; *ibid.*, 20 Apr. 1993, *Phuakan 9 (BKF)*; *ibid.*, 27 Nov. 1993, *Larsen et al. 44922 (AAU)*; *ibid.*, 6 Mar. 1999, *Wongprasert s.n. (BKF 122156)*; *ibid.*, 7 Mar. 1999, *Wongprasert s.n. (BKF 125502)*; Doi Ang Khang, 6 June 1973, *Sadakorn 230 (BK)*; *ibid.*, 26 June 1978, *Phengkklai et al. 4126 (BKF)*; *ibid.*, 9 Apr. 1975, *Sutheesorn 3276 (BK)*; Doi Fa Hom Pok, 25 Feb. 1958, *Sørensen et al. 1645 (BKF)*; 16 Mar. 1971, *Bogner 379 (K)*; 3 Mar. 2007, *Srathongjai 185 (KKU)*; Chiang Rai [Mae Chan, 20 Jan. 1970, *Sutheesorn 1489 (BK)*; Mae Lao, 25 Dec. 1965, *Iwatsuki & Fukuoka T-3486 (BKF)*; Mae Sai, 14 Feb. 2005, *Maxwell 05-100 (BKF)*; Mae Suai, 16 July 1967, *Bunchoo 1393 (BK-2 sheets)*; *ibid.*, Ban Saen Sa At, 4 July 1967, *Prayad 897 (BK)*; Wiang Pa Pao, 18 Mar. 2005, *Pooma et al. 4916 (BKF)*; Doi Fa Hom Pok NP, 15 Sept. 1967, *Iwatsuki et al. T-9720 (BKF)*; Doi Luang NP, 10 Dec. 2002, *Chamchumroon & C. Puff V.C.1789 (BKF-2 sheets)*; Khun Chae NP, 16 Mar. 2005, *Pooma et al. 4828 (BKF)*; Khun Korn waterfall, 12 Jan. 1997, *PK 3 (BCU)*; Nan [Na Noi, Doi Khun Sathan, 19 Nov. 1993, *Larsen et al. 44599 (AAU, BKF)*; Pua, Doi Phu Kha NP, 23 Sept. 2000, *Siriruga 1637 (BKF)*; Tha Wang Pha, 23 July 1992, *Larsen et al. 43507 (AAU, PSU)*, *43509 (AAU, P, PSU) & 43512 (AAU, BKF, P, PSU)*; *ibid.*, 8 Sept. 1995, *Larsen et al. 46217 (AAU)*; Lamphun [Mae Tha, Doi Khun Tan NP, 26 Dec. 1984, *Koyama & Phengkklai T-39036 (BKF)*; *ibid.*, 27 Dec. 1984, *Koyama & Phengkklai T-39053 (BKF)*; *ibid.*, 28 Dec. 1984, *Koyama & Phengkklai T-39175 (BKF)*; *ibid.*, 29 Jan. 1994, *Maxwell 94-137 (BKF)*; *ibid.*, 4 Sept. 1969, *Tagawa et al. T-9088 (AAU, BKF, K)*; *ibid.*, 2 Mar. 2012, *Norsaengsri et al. 9136 (BKF)*; Thoen, 19 Aug. 1995, *Parnell et al. 95-243 (K-2 sheets)*; Lampang [Hang Chat, Huai Mae San, 6 June 1983, *Koyama et al. T-31968 (BKF)*; Mueang, Mai Sai Kham, 1 Feb. 1926, *Winit 1589 (ABD, BK, K)*; Mae Luang, 5 Mar. 1926, *Winit 1636 (ABD, BK, BKF, K)*; Uttaradit [Phu Soi Dao NP, 19 Mar. 2002, *Chamchumroon & Puff VC1460 (BKF-2 sheets)*]; Tak [Mae Sot, 26 Jan. 1985, *Paisooksantivatana y1553-85 (BK)*; Mae Tuen, 24 Dec. 2002, *Niyomdham & Puudjaa 7064 (BKF)*; Umphang, 23 Apr. 2004, *Pooma et al. 4585 (AAU, BKF)*; Doi Mu Soe, 6 Apr. 1955, *Suvatabhandhu s.n. (BK-SN220687)*; Dec. 1960, *Umpai 50 (BK)*; Phitsanulok [Phu Miang, 26 July 1966, *Larsen et al. 1017 (AAU, P)*; Thung Salang Luang NP, 25 July 1973, *Murata et al. T-17108 (BKF)*]; Kamphaeng Phet [Klong Lan, 23 Apr. 2004, *Pooma et al. 3892 (BKF)*]; NORTH-EASTERN: Phetchabun [Lom Kao, 4 May 1955, *Smitinand 2613 (BKF)*; Nam Nao NP, 14 Mar. 1976, *Bunnak 3095 (BKF)*; *ibid.*, 14 Mar. 1976, *Sangkhachand 3095 (AAU, E, K, P)*; *ibid.*, 21 May 1951, *Smitinand 464-A (BKF)*; *ibid.*, 23 Feb. 2008, *Rrathongjai et al. 182 (KKU)*; 5 Jan. 1960, *Smitinand & Abbe 6317 (BKF, K)*; Loei [Na Haeo NP, 15 Mar. 2006, *Maknoi 692 (BKF)*; Phu Kradueng NP, 10 Feb. 1931, *Kerr 20054 (ABD, BK, BM, K)*; *ibid.*, 22 Feb. 1946, *Amporn 41 (BKF)*; *ibid.*, 12 Aug. 1946, *Din 146 (BKF)*; *ibid.*, 12 Mar. 1948, *Suvatabhandhu 80 (BCU, BK)*; *ibid.*, 12 Dec. 1950, *Dee 411 (BKF, K)*; *ibid.*, 22 Apr. 1955, *Smitinand 2502 (BKF)*; *ibid.*, 12 Apr. 1965, *Wang Kwang waterfall, Boonyamalik 3 (BCU)*; *ibid.*, 28 Nov. 1965, *Tagawa et al. T-498 (BKF)*; *ibid.*, 30 Nov. 1965, *Tagawa et al. T-892 (BKF)*; *ibid.*, 29 Aug. 1988, *Fukuoka T-63682 (BKF)*; *ibid.*, 30 Aug. 1988, *Takahashi & Tamura T-63279 (BKF)*; Phu Ruea NP, 16 Jan. 1967, *Smitinand 10155 (BKF)*; 30 Sept. 1990, *Chantarnothai et al. 90/484 (K)*; *ibid.*, 5 May 1997, *Puff 970504-1/4 (BKF)*; *ibid.*, 18 May 2004, *Pooma et al. 4052 (BKF)*]; Nong Khai [Phon Pisai, 2 June 1963, *Adisai 439 (BK)*]; Sakon Nakhon [Phu Phan NP, 13 Nov. 1984, 14 Dec. 1982, *Koyama et al. T-31027 (BKF)*; *ibid.*, 13 Nov. 1984, *Murata et al. T-51950 (BKF)*; *ibid.*, Kaeng Mot Daeng, 25 Feb. 1993, *Chantarnothai et al. 922 (K)*]; Khon Kaen [Phu Wiang, 19 Feb. 1963, *Pradit & Adisai 354 (BK)*]; EASTERN: Chaiyaphum [Mueang, 11 Jan. 1970, *Lekagul 56 (BKF)*; Phu Khiao, 20 Sept. 1984, *Fukuoka T-36230 (BKF)*]; Nakhon Ratchasima [Pak Chong, 1 Jan. 1924, *Marcan 1583 (ABD, BM, K)*; *ibid.*, Ban Khao Laem, 13 Mar. 1925, *Kerr 9974 (ABD, BK, BM, K)*; *ibid.*, 27 Dec. 1930, *Put 3542 (BK, BM, K)*];

ibid., Klang Dong, 31 Jan. 1962, *Larsen 9429* (BKF); ibid., 29 Jan. 1962, *Larsen & Smitinand 9342* (BKF) & *Larsen 9343* (BKF); Khao Yai NP, 14 Jan. 1968, *Greenman 1* (K); ibid., Khao Khiao, 19 Nov. 1982, *Koyama et al. T-30030* (AAU, BKF); ibid., 19 Nov. 1982, *Koyama et al. T-30062* (BKF); ibid., 18 Dec. 1987, *Puff & Ueachirakan 871218-1/1* (BKF); ibid., 27 May 2002, *Krissana 29* (BKF-2 sheets, K); ibid., 15 Mar. 2007, *Jiroath 1* (KKU); 20 Dec. 1962, *Phengklai 605* (BKF-3 sheets, K); Ubon Ratchathani [Buntharik, 15 Feb. 1954, *Ninwiset 14/2497* (BKF)]; Phu Chong Na Yoi NP, 22 Mar. 2007, *Wangwasit et al. 70322-12* (BKF)]; SOUTH-WESTERN: Uthai Thani [Ban Rai, Huai Kha Khaeng WS, 23 Feb. 1970, *Beusekom & Santisuk 2927* (AAU, BKF, P)]; Kanchanaburi [Si Sawat, 17 Jan. 1926, *Kerr 10240* (ABD, BK, BM, K); ibid., Ban Kheo Lek, 31 Dec. 1994, *Nisit s.n.* (BK- 97123116); ibid., 13 July 1973, *Sutheesorn 2590* (BK); Sangkhla Buri, 26 July 1968, *Prayad 1408* (BK); Thung Yai Naresuan WS, 17 Jan. 1994, *Maxwell 94-88* (BKF); Thong Pha Phum, Ban Tha Khanun, 19 Feb. 1967, *Chermisrivatana 637* (BK); ibid., 29 Apr. 1967, *Prayad 825* (BK); ibid., Kroeng Kawia, 27 Feb. 1981, *Bunnak & Tanee 3209* (BKF-2 sheets); ibid., 9 Jan. 1985, *Koyama et al. T-48943* (BKF); ibid., Ban Tha Ma Duea, 11 Mar. 2002, *Srapratet 135* (BCU)]; Phetchaburi [Kaeng Krachan NP, 10 Dec. 2002, *Middleton et al. 1541* (E, K); ibid., Khao Phanoen Thung, 26 Jan. 2005, *Williams et al. 1094* (BKF)]; Prachuap Khiri Khan [Khao Luang, 5 July 1926, *Kerr 10838* (ABD, BK, BM, K)]; CENTRAL: Saraburi [Sam Lan, 22 Dec. 1973, *Maxwell 73-778* (AAU, BK)]; Nakhon Nayok [Khao Yai NP, 16 Feb. 1966, *Iwatsuki & Fukuoka T-7372* (AAU, BKF); ibid., 17 Feb. 1966, *Iwatsuki & Fukuoka T-7436* (BKF); ibid., 8 Feb. 2002, *Charoenchai & Poompuang 186* (BK); ibid., 9 Mar. 1987, *Lambinon 87/59* (AAU); Sarika waterfall, 23 Jan. 1960, *Keoboonrueng 6* (BCU)]; SOUTH-EASTERN: Sa Kao [Pang Sida NP, 18 May 1997, *Puff 970517-1/4* (BKF)]; Prachin Buri [Khao Yai NP, 12 July 1966, *Larsen et al. 317* (AAU, BKF, K, P)]; Chon Buri [Si Racha, Khao Khiao, 28 Mar. 1976, *Maxwell 76-174* (BK)]; Chanthaburi [Makham, 3 July 1945, *Noopakdee 209* (BKF)]; Trat [Ko Chang, Khlong Mayom, 4 Apr. 1923, *Kerr 6865* (ABD, BK, BM, K)]; PENINSULAR: Songkhla [Rattaphum, 22 May 1944, *Wecakul 26* (PSU)].

Distribution.— Myanmar, Laos, Vietnam.

Ecology.— Scattered in old clearings, oak-pine, pine, dry evergreen and evergreen forests, 100–2400 m alt.

Vernacular.— Kaboe khao (กะเบ้อ๊อขาว)(Loei); kamboe (กำบ้อ), phisuea (ผีเสื้อ)(Phetchabun); kaem khao (แก้มขาว)(Central, Nakhon Ratchasima); photae (พอแต)(Karen-Chiang Mai).

Note.— On examination of the type material I have concluded that *M. cambodiana* var. *lanceolata* should be regarded as conspecific with *M. sanderiana*. In its habit, *Mussaenda sanderiana* is very like *M. cambodiana* which has a broad and overlapping distribution, but *M. sanderiana* differs from *M. cambodiana* in its dense hairs on the leaves and calyx lobes which are shorter than the calyx tube.

**13. *Mussaenda uniflora*** Wall. ex G. Don, Gen. Syst. 3: 491. 1834.— *Acranthera uniflora* (Wall. ex G. Don) Kurz, J. Asiat. Soc. Bengal 41: 312. 1872.— *Aphaenandra uniflora* (Wall. ex G. Don) Bremek., Blumea, suppl. 1: 121. 1937. Type: Myanmar (Burma), Tavoy, *Wallich 6264* (lectotype K-W, selected here; isolectotype K).

*Mussaenda theifera* Pierre ex Pit. in Lecomte, Fl. Indo-Chine 3: 184. 1923. Type: Cambodia, Kep, 17 July 1905, *Geoffray 481* (lectotype P 03800594, selected here; isolectotype P 03800602).

*Mussaenda theifera* var. *laotica* Pit. in Lecomte, Fl. Indo-Chine 3: 185. 1923. Type: Vietnam, Hué, Quang-tri, *Harmand 187* (lectotype P 03800597, selected here).

Thailand.— NORTHERN: Mae Hong Son [Mae Sariang, 7 July 1966, *Prayad 319* (BK); Khun Yuam, 6 Sept. 1974, *Larsen & Larsen 34194* (AAU)]; Chiang Mai [Fang, 10 May 1905, *Hosseus 603* (BM, K); Doi Suthep, 15 June 1909, *Kerr 680* (BM, K); ibid., 19 July 1921, *Kerr 50* (K); ibid., 28 July 1992, *Larsen et al. 43712* (AAU)]; Chiang Rai [Doi Pha Hom Pok NP, 11 Sept. 1967, *Iwatsuki et al. T-9547* (AAU, K, L)]; Nan [Khun Mo Tom, 26 July 1992, *Larsen et al. 43635* (AAU); Pua, 9 June 1994, *Palee 185* (L)]; Lampang [Huai Taek, 24 Sept. 1967, *Shimizu et al. T-10732* (AAU, K, L); Mae Yom, 21 May 1925, *Winit 1413* (ABD, BK, BKF, K)]; Tak [Bhumipol Dam, May 1959, *Boonchoo 740* (BCU, BK)]; Phitsanulok [Thung

Salaeng Luang NP, 19 July 1966, *Larsen et al.* 472 (AAU, L); *ibid.*, 25 Jul 1973, *Murata et al.* T-17049 (AAU, K); NORTH-EASTERN: Nong Khai [Phon Phisai, 9 June 1963, *Adisai* 493 (BK)]; Kalasin [Kuchinarai, 7 Aug. 1968, *Pradit* 342 (BK)]; EASTERN: Chaiyaphum [Thung Kamang, 25 May 1974, *Geesink et al.* 6963 (BKF, K, L)]; Nakhon Ratchasima [Pak Thong Chai, 16 June 1968, *Phusomsaeng* 484 (BKF, E, K)]; Pak Chong, Khao Yai NP, 23 May 2002, *Maxwell* 02-141 (L)]; Ubon Ratchathani [8 June 1932, *Lakshnakara* 861 (BK, BM, K)]; Khong Chiam, 22 May 2001, *Greijmains* 71 (BKF, L)]; SOUTH-WESTERN: Kanchanaburi [Wang Ka, 29 Apr. 1946, *Wichian* 198 (BK, K, L)]; Si Sawat, 15 May 1962, *Kasem* 114 (BK)]; Sangkhla Buri, 20 July 1968, *Prayad* 1379 (BK)]; Sai Yok, 30 June 1963, *Larsen* 10350 (AAU)]; Thong Pha Phum, Hin Dat, 30 June 1926, *Put* 49 (ABD, BK, BM, K)]; *ibid.*, 3 July 1973, *Maxwell* 73-81 (AAU, BK)]; CENTRAL: Saraburi [Botanical Garden, 17 Oct. 1960, *Puangsap* 12 (BCU)]; Sam Lan, 28 Apr. 1974, *Maxwell* 74-321 (BK, L)]; *ibid.*, 20 May 1974, *Maxwell* 74-537 (AAU, BK)]; SOUTH-EASTERN: Prachin Buri [Khao Yai NP, 13 July 1966, *Larsen et al.* 409 (AAU)]; Chon Buri [Si Racha, Ban Dan, 30 Mar. 1920, *Marcan* 144 (ABD, BM, K) & *Kerr* 4136 (BM, K)]; Chanthaburi [Soi Dao, 7 June 1963, *Larsen* 9831 (AAU)]; Trat [Khao Saming, 29 Mar. 1925, *Nai Noe* 16 (BK, BM, K)].

Distribution.— Myanmar (Tavoy, Tenasserim), Laos (Vientiane), central and southern Vietnam, Sumatra, Java.

Ecology.— In open places, dense mixed forest, and disturbed dry dipterocarp forest, 150–1300 m alt.

Vernacular.— Mali lueai (มะลิเลื้อย)(Trat); kaem num (แก้มนุ่น)(Northern).

Note.— Although *Mussaenda uniflora* superficially resembles *M. parva* in having no calyco-phylls, it differs in possessing a longer corolla lobe. Seven collections, *Couderc s.n.* (P 03800600), *Geoffray 481* (P 03800594 & P 03800602), *Harmand s.n. n.v.*, *Hayata 787* (P 03800601), *Pierre 468* (P 02273431, P 02273432, P 02273433, P 02273434, P 02273435, P 02273436, P 02273437 & P 02273438) & 3259 (P 03800595) & *Thorel 1121* (P 03800592 & P 03800593), are mentioned in the original

description of *Mussaenda theifera*. *Geoffray 481* is the best preserved and, therefore, it is selected here as the lectotype.

Three collections, *Harmand 187* (P03800597) from Vietnam, *Massie s.n. n.v.* from Laos & *Thorel s.n.* (P 03800598 & P 03800599) from Cambodia are mentioned in the original description of *Mussaenda theifera* var. *laotica*. *Harmand 187* is selected as the lectotype because it is well preserved.

**14. *Mussaenda variolosa*** Wall. ex G. Don, Gen. Syst. 3: 490. 1834. Type: Myanmar (Burma), Amherst, *Wallich 6259* (lectotype K-W, selected here).

Thailand.— PENINSULAR: Ranong [Kra Buri, *Middleton et al.* 2712 (BKF, K)]; Mueang Len, 11 Jan. 1966, *Hansen & Smitinand 11905* (E, K)]; Krabi [Khao Phanom Bencha NP, 28 Mar. 1930, *Kerr 18740* (ABD, BK, BM, K)]; Nakhon Si Thammarat [Lan Saka, 17 May 1985, *Ramsri 52* (PSU)]; Trang [Khao Sung, 16 Apr. 1928, *Kerr 15238* (ABD, BK, BM, K)]; Songkhla [Hat Yai, Khao Chum Sak, 22 Oct. 1993, *Larsen et al.* 43905 (AAU)]; Yala [31 Jan. 1931, *Put 3694* (AAU, BK, BM, E, K)]; Bannang Sata, Kue Long, 3 Sept. 1977, *Sirirugsa 135* (PSU-2 sheets)].

Distribution.— Myanmar.

Ecology.— Margin of evergreen forest, 150–1300 m alt.

Vernacular.— Tang dok (ตางดอก)(Ranong).

Note.— *Mussaenda variolosa* is characterise by having strigose hairs on leaves and calyx lobe which is shorter than calyx tube.

**15. *Mussaenda villosa*** Wall. ex G. Don, Gen. Syst. 3: 489. 1834. Type: Peninsular Malaysia, Penang, *Wallich 6254* (lectotype K [K000740942], selected here, isolectotype K-W).

*Mussaenda villosa* Wall. ex G. Don var. *herveyana* King, Journ. Asiat. Soc. Bengal 72: 184. 1904. Type: Peninsular Malaysia, Malacca, Aug. 1886, *Hervey s.n.* (holotype K), **syn. nov.**

Thailand.— NORTHERN: Chiang Mai [Doi Chiang Dao WS, 4 June 1921, *Kerr 5608* (BK, BM, K)]; Fang, Doi Ang Khang, 4 June 1973, *J. Sadakorn 217* (BK)]; *ibid.*, 15 July 1973, *Sutheesorn*

2431 (**BK**-2 sheets); Mae Cham, 16 July 1981, *Bunnak 3276* (**BKF**-2 sheets); Doi Inthanon, 5 Dec. 1984, *Koyama & Phengkklai T-48807* (**BKF**); SOUTH-WESTERN: Phetchaburi [Kaeng Krachan NP, 10 Aug. 2002, *Middleton et al. 927* (**BKF**)]; Prachuap Khiri Khan [Khao Luang, 3 July 1926, *Kerr 10783* (**ABD, BK, BM, E, K**)]; PENINSULAR: Chumphon [Tha Sae, 30 May 1969, *Prayad 93* (**BK**); 30 May 1969, *Jaray 93* (**K**)]; Ranong [Kapoe, 14 Nov. 1965, *Sangkhachand 1126* (**BKF, E, K, P**)]; Mueang, Ko Phayam, 24 Apr. 2006, *Wongprasert 064-6* (**BKF**-2 sheets); Khlong Naka, 25 Apr. 1973, *Geesink & Santisuk 4860* (**AAU, BKF, E, K, P**); Surat Thani [Ko Tao, 15 Apr. 1927, *Kerr 12745* (**ABD, BK, BM, K**); *ibid.*, 18 Apr. 1927, *Kerr 12809* (**ABD, BM**-2 sheets, **K**); *ibid.*, 22 July 1927, *Kerr s.n.* (**BM**) & *s.n.* (**BK-SN220655**); Ban Kawp Kep, 13 Aug. 1927, *Kerr 13318* (**AAU, ABD, BK, BM, K**) & *13321* (**AAU, ABD, BK, BM, E, K**); *ibid.*, 7 Nov. 1927, *Put 1194* (**ABD, BK, BM, K**); Bangbao, 13 Aug. 1955, *Smitinand 2937* (**BKF**); Ko Samui, 21 June 1966, *Sutheesorn 1089* (**BK**); *ibid.*, Chaweng, *Sanan 730* (**BKF**); Khao Sok NP, 16 Apr. 1991, *Dawson 11* (**BKF, K**-2 sheets); Phangnga [Nop Pring, 11 Mar. 1930, *Kerr 18524* (**AAU, ABD, BK, BM, K**); Thap Put, 24 Aug. 1967, *Shimizu et al. T-7909* (**BKF**); E of Phangnga, 23 Aug. 1967, *Shimizu et al. T-7883* (**BKF, K**); Khao Khlong Yang, 6 July 1972, *Larsen et al. 30673* (**AAU, BKF, K, P**); Ko Surin Nuea, 18 Apr. 1976, *Chermsirivatana & Smitinand 2125* (**BK**); Ko Yao, 1 May 2007, *Suddee et al. 3150* (**BKF**); Kura Buri, 26 Nov. 2006, *Muadsub 156* (**BKF**); Phuket [Katu, 12 Mar. 1929, *Kerr 17472* (**ABD, BK, BM, K**); Thalang, 7 May 1968, *Beusekom & Phengkklai 607* (**AAU**-2 sheets, **E, K, P**); Krabi [Mueang, 18 Aug. 1964, *Sangkhachand 1038* (**BKF, E, K**); Khlong Thom, Khong Phon, 24 May 1916, *Vanpruk 840* (**BKF, K**); *ibid.*, 3 Oct. 2005, *Maxwell 05-534* (**BKF**); Nakhon Si Thammarat [Khao Luang, Thap Chang, 29 Jan. 1966, *Hansen & Smitinand 12167* (**BKF**); *ibid.*, 23 May 1968, *Beusekom & Phengkklai 946* (**AAU, BKF, E, K, P**); Ko Tachai, Apr. 2000, *Phengkklai et al. 12815* (**BK**-2 sheets); 27 July 1984, *Huaman 6* (**PSU**); Lan Saka, 19 May 1985, *Ramsri 76* (**BKF, L, PSU**-2 sheets); Khanom, 18 Feb. 2004, *Middleton et al. 3188* (**BKF**); Phatthalung [Khao Pu-Khao Ya NP, 11 Jul 1993, *Puff & Sridith 930710-1/10* (**AAU, PSU**); *ibid.*, 14

July 2000, *Middleton et al. 442* (**BKF, E, K, L**); Trang [Yan Ta Khao, 23 Apr. 2001, *Patsarakulnanon et al. 188761* (**BKF**-2 sheets); *ibid.*, 3 Oct. 2005, *Esser et al. 05-57* (**K**-2 sheets); Khao Chong, 13 Aug. 1975, *Maxwell 75-822* (**AAU, BK, L**); Satun [18 May 1960, *Chirayupin 13* (**BK**); Malacca Creek and Talo Wao Bay, 14 Feb. 1979, *Hamilton & Congdon 242* (**PSU**); Tarutao island, 19 Feb. 1979, *Hamilton & Congdon 292* (**AAU, PSU**); Mueang, Rawi island, 13 Apr. 1987, *Maxwell 87-329* (**BKF, PSU**); Thale Ban NP, 3 June 2001, *Pooma et al. 1955* (**BKF**-2 sheets)]; Songkhla [Sadao, Padang Besar, Dec. 1927, *Kerr 13651* (**ABD, BK, BM, E, K**); Hat Yai, Ko Hong Hill, 1 Dec. 1960, *Tirvengadum & Nanakorn 1973* (**AAU**); *ibid.*, 19 Dec. 1978, *Hamilton & Congdon 84* (**AAU, BCU**-2 sheets, **BKF, PSU**); *ibid.*, Ratthapoom, Ton Nga Chang WS, 29 Apr. 1979, *Hamilton & Congdon 406* (**AAU, BCU, PSU**); *ibid.*, Rubber Research Center, 22 Aug. 1980, *Students 1* (**PSU**); *ibid.*, 27 Aug. 1981, *Sirin & Gunniga 9* (**PSU**); *ibid.*, 30 Aug. 1984, *Maxwell 84-150* (**BKF, PSU**); Khao Chum Sak, 12 June 1992, *Larsen et al. 42834* (**AAU, BKF, P, PSU**); *ibid.*, Ton Phlio waterfall, 2 June 2001, *Pooma et al. 1921* (**BK**-2 sheets); Khao Nam Khang NP, 23 July 1994, *Puraboot 6* (**PSU**); Pattani [Ban Sai Kao, 28 Mar. 1928, *Kerr 14860* (**AAU, ABD, BK, BM, K**); Sai Kao waterfall, 17 June 1979, *Hamilton & Congdon 456* (**PSU**-3 sheets) & *459* (**PSU**-4 sheets)]; Yala [Bang Lang Dam, 17 July 1993, *Puff & Sridith 930717-2/1* (**AAU**); Bannang Sata, Kue Long, 24 Apr. 1974, *Geesink & Hattink 6380* (**BKF, K**-2 sheets)]; Narathiwat [Waeng, 19 Aug. 1966, *Sangkhachand & Nimanong 1230* (**BKF, K, P**)].

Distribution.— Peninsular Malaysia.

Ecology.— In scrub, disturbed forest, lowland forest, and margins of evergreen forest, alt. 0–1300 m alt.

Vernacular.— Dok khem (ดอกเข็ม)(Trang); thong hu phe thap (ทองหูแพทับ)(Phangnga); ba-le-a-da (Malay-Narathiwat); bai tang dok (ใบต่างดอก) (Ranong).

Note.— *Mussaenda villosa* differs from *M. variolosa* in its calyx lobes longer than, or rarely more or less the same size as, the calyx tube. King (1904) established *Mussaenda villosa* var. *herveyana* based on *Hervey s.n.* (**K**) which has smaller leaves

and is densely pilose on the lower leaf surface. After examination of the specimens, I found that these characters are not sufficient to separate two taxa and, therefore, I place this variety in synonymy of the species.

**16. *Mussaenda wallichii*** G. Don, Gen. Syst. 3: 490. 1834.— *Mussaenda longifolia* Wall., Numer. List 6258. 1932, nom. nud. Type: Myanmar (Burma), *Wallich 6258* (lectotype **K-W**, selected here).

*Mussaenda oblonga* King, J. Asiat. Soc. Bengal 72: 186. 1904. Type: Peninsular Malaysia, Perak, Larut. June 1881, *King's Collector 1935* (lectotype **K** [K000740937], selected here), **syn. nov.** Fig. 1D.

Thailand.— NORTHERN: Chiang Rai [Khun Korn waterfall, 19 June 1999, *PK 181* (**BCU**)]; Phitsanulok [Lom Sak, 13 June 1960, *Smitinand &*

*St. John 6842* (**BKF, K**); Thung Salaeng NP, 20 July 1966, *Larsen et al. 564* (**AAU, P**); SOUTH-WESTERN: Kanchanaburi [Wangka, 16 May 1946, *Suvatabhandhu 65* (**BK**) & 396 (**K**); Sangkhla Buri, 28 July 1968, *Prayad 1427* (**BK**); Thong Pha Phum, 6 Sept. 1990, *Puff et al. 900905-4/1* (**BKF**)]; Phetchaburi [Kaeng Krachan NP, 5 Aug. 1995, *Larsen et al. 45404* (**AAU**)]; SOUTH-EASTERN: Rayong [Klaeng, Khao Chamao NP, 8 Nov. 1994, *Maxwell 94-1199* (**L**)]; Chanthaburi [Pong Nam Ron, 12 May 1974, *Maxwell 74-445* (**AAU, BK**); Khao Sabap, 6 July 1927, *Put 907* (**ABD, BK, BM, E, K**); Trat [Ko Chang, 7 June 1925, *Rabil 52* (**BK**); Ta Kum, 13 May 1930, *Put 2882* (**AAU, ABD, BK, BM, K**)]; PENINSULAR: Ranong [Ngao waterfall, 6 Sept. 1984, *Na Nakorn 636* (**BKF**); Kra Buri, 27 Aug. 2002, *Middleton et al. 1333* (**L**) & 1382 (**BKF, E, K**); Surat Thani [Ban Kawp



Figure 1. *Mussaenda cambodiana* Pierre ex. Pit.: A. habit and inflorescence; *M. kerrii* Craib: B. habit and inflorescence; *M. purpurascens* Ridl.: C. habit and inflorescence; *M. wallichii* G. Don: D. habit and infructescence. Photographed by P. Phonsena.

Kep, 4 Aug. 1927, *Kerr 13161* (**ABD, BK, BM, E, K**); Khao Sok NP, 15 Sept. 1994, *Boyce 960* (**K**); *ibid.*, 15 Apr. 1991, *Dawson 5* (**K**); Phangnga [Takua Pa, 13 July 1972, *Larsen et al. 30895* (**AAU, BKF, E, K**); Khao Nang Hong, 4 Aug. 1975, *Sutheesorn 3362* (**BK**)]; Phuket [Thalang, Khao Phra Thaeo, *Dawson 19* (**BKF, K**)]; Nakhon Si Thammarat [Thung Song, 27 Aug. 1967, *Shimizu et al. T-8178* (**E, K**)]; Phatthalung [Ban Khao Din, 19 Apr. 1928, *Kerr 15312* (**ABD, BK, BM, K**); Khao Soi Dao, 29 Apr. 1930, *Kerr 19446* (**ABD, K**); Si Banphon, 30 July 1986, *Maxwell 86-518* (**PSU**)]; Trang [Khao Chong, 14 Sept. 1933, *Collins 2385* (**BM, K**); *ibid.*, 11 Aug. 1975, *Maxwell 75-745* (**AAU, BK, L**); *ibid.*, 14 Aug. 1975, *Maxwell 75-857* (**BK, L**); *ibid.*, 20 May 1960, *Chirayupin 32* (**BK**); *ibid.*, 27 June 1969, *Sangkhachand 1921* (**BK**); *ibid.*, 15 July 1969, *Sangkhachand 1989* (**BK**); *ibid.*, 17 June 1978, *Brasit 21* (**PSU-2 sheets**)]; Satun [Khuan Ka Long, 18 Aug. 1984, *Maxwell 84-81* (**PSU**); Thale Ban NP, 12 Sept. 1990, *Puff et al. 900912-2/2* (**BKF**)]; Pattani [Bannang Sata, 23 July 1923, *Kerr 7379* (**ABD-2 sheets, BK, BM, K-2 sheets**)]; Yala [Nikom Kua Leng, 11 Dec. 1972, *Santisuk & B.N. 381* (**BKF, K, L**)]; Narathiwat [Sungai Kolok, 6 Mar 1974, *Larsen & Larsen 33034* (**AAU**)].

Distribution.— India (Nicobar Islands), Southern Myanmar, Peninsular Malaysia.

Ecology.— Margin of evergreen forest and lowland evergreen forest with bamboo, 10–900 m alt.

Vernacular.— Kha ma bit (ขาม้าบิต); pha khamoi (ผาขมิย); phai thuean (ไผ่เถื่อน)(Chanthaburi).

Note.— *Mussaenda wallichii* is clearly similar to *M. kerrii* but differs by having a glabrous ovary and cuspidate calycophyll apices. Comparison of material of *Mussaenda wallichii* and *M. oblonga* reveals that they are conspecific. Three collections, *King's Collector 1935* (**K**) & *3542* (**K**), collected by *Wray*, and *Curtis 3303* (**K**), are mentioned in the original description of *Mussaenda oblonga*. *King's Collector 1935* (**K**) is the best preserved and therefore, it is selected here as the lectotype.

**17. *Mussaenda wrayi*** King, J. Asiat. Soc. Bengal 72: 182. 1904. Type: Peninsular Malaysia, Perak, Sept. 1886, *King's Collector 10943* (lectotype **K**, selected here).

*Mussaenda mollis* Geddes, Bull. Misc. Inform. Kew 1927: 171. 1927. Type: Thailand, Yala (former Pattani), Banang Sata, 22 July 1923, *Kerr 7285* (lectotype **K** 000843195, selected here; isolectotypes **K** 000843196, **BK** 257408), **syn. nov.**

Thailand.— NORTHERN: Nan [Pua, 26 June 2008, *Pooma & Tamura 7111* (**BKF**)]; Tak [Umphang, 14 Apr. 1999, *Chayamarit et al. 1600* (**BKF-2 sheets**)]; EASTERN: Nakhon Ratchasima [Khao Yai NP, 31 Oct. 1969, *Beusekom & Charoenpol 1957* (**AAU, BKF, P**)]; PENINSULAR: Ranong [Ban Racha Krude, 7 July 1992, *Larsen et al. 43193* (**AAU, BKF, PSU**)]; Phangnga [Ko Yao, Ko Yao Yai, 3 May 2007, *Wongprasert 075-37* (**BKF-2 sheets**)]; Phatthalung [Khao Banthat WS, 27 July 1993, *Puff & Sridith 930724-1/2* (**AAU**)]; Pattani [Bannang Sata, 22 July 1923, *Kerr 7285* (**ABD, BK, BM, K-2 sheets**)]; Yala [Betong, Bang Lang NP, 19 July 2004, *Pooma et al. 4435* (**AAU, BKF**)]; Narathiwat [Sukhirin, 21 July 2004, *Pooma et al. 4516* (**AAU, BKF**)].

Distribution.— Peninsular Malaysia.

Ecology.— Margin of evergreen forest, 50–600(–1700) m alt.

Vernacular.— Tang dok ray (ตางดอกเรย์).

Note.— *Mussaenda wrayi* is distinct from other species of *Mussaenda* in having a densely pilose calyx with elliptic or oblanceolate lobes, the lobes are longer than the tube and corolla tube is 10–12 mm long. Comparison of material of *Mussaenda wrayi* and *M. mollis* reveals them to be conspecific. King (1904) cited several syntypes for *Mussaenda wrayi* (*Wray 40 n.v.*, *1788 n.v.* & *2583 n.v.*; *King's Collector 685 n.v.*, *1960 n.v.*, *5353* (fruiting, **K-2 sheets**) & *10943* (**K**); *Scortechini s.n. n.v.*; *Curtis 1024 n.v.*, *2730* (**K**), *3304* (**K**)). *King's Collector 10943* is selected to be the lectotype because it is well preserved.

## ACKNOWLEDGEMENTS

I am grateful to the Curators, Keepers, librarians and staff of all herbaria visited for access to material in their charge. I thank Dr K. Ruengsawang for specimen data from L, Dr P. Phonsena for the photographs, anonymous reviewers for helpful comments, Dr B. Boonsuk for his help in various ways, and especially Dr D.J. Middleton for his

valuable comments and suggestions. This work was supported in part by the Applied Taxonomic Research Center grant ATRC-R5706, Khon Kaen University and the Aarhus University Research Fellow 2014, Denmark.

## REFERENCES

- Alejandro, G.D., Razafimandimbison, S.G. & Liede-Schumann, S. (2005). Polyphyly of *Mussaenda* inferred from ITS and *trnT-F* data and ITS implication for generic limits in Mussaendeae (Rubiaceae). *American Journal of Botany* 92(3): 544–557.
- Bremer, B. & Thulin, M. (1998). Collapse of Iserctieae, re-establishment of Mussaendeae, and a new genus of Sabiceae (Rubiaceae); phylogenetic relationships based on *rbcL* data. *Plant Systematics and Evolution* 211: 71–92.
- Bremer, B., Jansen, R.J., Oxelman, B., Backlund, M., Lantz, H. & Kim, K.-J. (1999). More characters or more taxa for a robust phylogeny-case study from the coffee family (Rubiaceae). *Systematic Botany* 48: 413–435.
- Craib, W.G. (1932). *Florae Siamensis Enumeratio: A list of the plants known from Siam with notes of their occurrence. Caprifoliaceae & Rubiaceae (in part). vol. 2, 76.* Siam Society, Bangkok, Thailand.
- Govaerts, R., Ruhsam, M., Andersson, L., Robbrecht, E., Bridson, D., Davis, A., Schanzer, I. & Sonké, B. (DATE). *World Checklist of Rubiaceae*. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/rubiaceae/> accessed on: 14 October 2015.
- Hua Shu, Y.Y.J., Tao, C. & Taylor, C.M. (2011). *Mussaenda*. In: Zhengyi, W., Raven, P.H. & Deyuan, H. (eds.), *Flora of China* 19: 231–242. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis.
- Jayaweera, D.M.A. (1963). The Rubiaceae Genus *Mussaenda*: The Species of India and Ceylon. *Journal of the Arnold Arboretum* XLIV 44(2): 232–267.
- King, G. (1904). Materials for a Flora of the Malayan Peninsula. *Journal of the Asiatic Society of Bengal*. 72, part 2 Natural Science, no. 4: 111–229.
- Lorence, D.H. (1999). A nomenclator of Mexican and Central American Rubiaceae. *Monographs in Systematic Botany from the Missouri Botanical Garden* 73: 1–177.
- Mabberley, D.J. (2008). *Mabberley's Plant-Book A portable dictionary of plants their classification and uses*. 3rd ed., Cambridge University Press.
- Pitard, J. (1923). Rubiaceae. In: *Flore générale l'Indo-Chine*. H.M. Lecomte (ed.), vol. 3, fasc. 2: 145–288, Masson, Paris.
- Puff, C., Chayamarit, K. & Chamchumroon, V. (2005). *Rubiaceae of Thailand: A pictorial guide to indigenous and cultivated genera*. Prachachon, Bangkok.
- Thiers, B. (2014). *Index Herbariorum: A global directory of public herbaria and Associated staff*. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/science/ih/> accessed on: 5 December 2014.
- Wood, J.R.I. (1999). *Mussaenda* L. In: A.J.C. Grierson & D.G. Long (eds.), *Flora of Bhutan* 2(2): 781–784. Royal Botanic Garden Edinburgh & Royal Government of Bhutan.