



Corrective notes on the Malesian members of the genus *Ficus* (Moraceae)

C.C. Berg¹

Key words

Ficus
Malesia
Moraceae

Abstract *Ficus gibbsiae* and *F. laeviscarpa* are re-instated, the descriptions of *F. benguetensis* and *F. macilenta* are amended, *F. fistulosa* is re-evaluated and subdivided, and a key to the species discussed and found in the Philippines is presented; *F. peninsula* and *F. prasinicarpa* are validated, and *F. cuneata* is replaced by *F. cuneiformis*.

Published on 28 July 2011

FICUS GIBBSIAE AND *F. MACILENTA*

The still increasing amount of *Ficus* collections to be identified comprises pleasant surprises as discoveries of undescribed species and less pleasant ones indicating the need of reconsideration of taxonomic decisions made and published. Some Bornean collections initially believed to belong to *F. chartacea* proved to match the type of *F. gibbsiae* Ridl. (1915), reduced by Corner (1960a) to a subspecies of *F. macilenta* King. However, the nature and consistency of the characters that distinguish collections already included in var. *gibbsiae* and three additional ones from the majority of the collections included in *F. macilenta* lead to the conclusion that *F. gibbsiae* has to be reinstated.

Ficus gibbsiae Ridl.

Ficus gibbsiae Ridl. (1915) 137; Merr. (1921) 223. — *Ficus macilenta* King var. *gibbsiae* (Ridl.) Corner (1960a) 439. — Type: *Gibbs 4008* (holo K), Sabah, Mt Kinabalu, Gurulau, c. 1700 m.

Treelet or shrub up to 4 m, much-branched. *Leafy twigs* 1.5–2 mm thick, very sparsely white appressed puberulous near the nodes to subglabrous, without glands, periderm flaking off (below the leaves). *Leaves* spirally arranged, lamina oblong to elliptic to subrhombic, 4–16 by 2–4.5 cm, subcoriaceous, apex acuminate to subcaudate, base cuneate to obtuse, margin entire or coarsely dentate to sublobate; upper surface glabrous or with a few minute hairs at the base of the midrib, smooth, lower surface glabrous, smooth; cystoliths absent (?), lateral veins 5–7 pairs, slightly prominent, the basal pair running close to the margin, up to c. 1/6 the length of the lamina, unbranched, tertiary venation almost reticulate slightly prominent to almost flat beneath, waxy glands in the axils of the basal lateral veins, partly extending to the midrib; petiole 1.5–3.5 cm long, c. 1 mm thick, sparsely minutely white puberulous, the epidermis flaking off (starting) at the upper part and base; stipules 0.5–1 cm long, white appressed-puberulous to subsericeous, caducous. *Figs* axillary, in pairs; peduncle 0.1–0.25 mm long; basal bracts 3, 0.5–1.5 mm long, whitish ciliolate; receptacle subglobose, 0.5–0.6 cm diam when dry, very sparsely minutely whitish puberulous, reddish to purplish at maturity (?), apex convex,

ostiole c. 1 mm diam, slightly prominent to sunken, the ostiolar bracts white hairy; internal hairs abundant, yellowish. *Style of long-styled pistillate flower* glabrous.

Distribution — Borneo: Brunei, Sabah, Sarawak

Ecology — Forest; at altitudes up to c. 1 600 m.

Collections included. BRUNEI, Distr. Temburong, Subdistr. Amo, Bukit Tudal, 760–840 m, *Kirkup 967* (L); Distr. Temburong, Bukit Belalong, *Wong 1367* (L). — SABAH, Mt Kinabalu, c. 1300 m, *Clemens et al. 26938* (L); near Kinabalu National Park, above Kiau II Gurulau ridge, 1500–1700 m, *Kanis & Kuripin SAN53969* (L); Kinabalu, Penibukan, Bahandoi, Sg. Tahuban, 900 m, *Nooteboom et al. 1521* (L); Distr. Tenom, Kapilu, road to Kampong Rendum, 360 m, *Saikh L. SAN73547* (L). — SARAWAK, Division Bintulu, Bukit Kana, Ulu, Sg. Sangan, Tatau, 750 m, *Yii Puan Ching & Asah S66924* (L).

Note — This species strikingly resembles the partly sympatric *F. chartacea* King in its vegetative parts, but the hairy tepals indicate that it belongs to sect. *Auratae* instead of sect. *Eriosycea*. The close relationship to *F. macilenta* is already indicated by inclusion of this species. *Ficus gibbsiae* differs from *F. macilenta* in the (almost) glabrous and smooth lamina (in contrast to an at least beneath distinctly hairy and above scabrous to scabridulous lamina), the acuminate to subcaudate apex of the lamina (in contrast to a acuminate to acute apex), the slightly prominent to flat venation, in particular the reticulum both beneath and above (vs a prominent reticulum). Moreover, the petiole tends to be longer in *F. gibbsiae* and the peduncle longer in *F. macilenta*.

Ficus macilenta King

Ficus macilenta King (1888) 155, t. 196; Merr. (1921) 225; Corner (1965) 49. — *Ficus macilenta* King var. *ilicifolia* Corner (1960a) 439.

Shrub or tree(let) up to 8 m tall. *Leafy twigs* 2–3 mm thick, whitish appressed-puberulous to brownish hirtellous, periderm persistent. *Leaves* spirally arranged (to subdistichous), lamina elliptic to ± rhombic to oblong to sub lanceolate, 2–15 by 1.5–6.5 cm, (sub)coriaceous, apex acuminate to acute, base cuneate to obtuse, margin irregularly ± coarsely dentate to lobed, upper surface sparsely whitish appressed-puberulous to brownish strigillose on the midrib and for the rest hispidulous, scabrous to scabridulous (to almost smooth), lower surface sparsely to densely white puberulous to brownish hirtellous on the veins, scabridulous to almost smooth, cystoliths absent, lateral veins 4–8(–9) pairs, the basal pair running close to the margin, up to 1/4 the length of the lamina, unbranched, other

¹ Bergen Museum, University of Bergen, Allégate 41, 5007 Bergen, Norway; Netherlands Centre for Biodiversity Naturalis (section NHN), Leiden University, P.O. Box 9514, 2300 RA Leiden, The Netherlands; e-mail: berg@nhn.leidenuniv.nl.

lateral veins often furcate far from the margin, tertiary venation loosely subscalariform, \pm prominent beneath, reticulum \pm prominent as well, waxy gland partly or largely on the midrib at the bases of the basal lateral veins; petiole 0.5–2.2 cm long, glabrous or brown hirtellous, the epidermis persistent; stipules 0.4–0.8 cm long, whitish to brownish appressed-puberulous to subsericeous, caducous. *Figs* axillary, in pairs, subsessile or with a peduncle 0.1–0.5 cm long; basal bracts 3, 1–1.5 mm long, appressed-puberulous; receptacle (sub)globose, 0.6–1 cm diam when dry, subglabrous or appressed-puberulous to brown hirtellous, red at maturity, apex slightly convex, ostiole c. 2 mm diam, flat to \pm sunken and with hairs on ostiolar bracts; internal hairs abundant, whitish. *Style of long-styled pistillate flower* glabrous.

Distribution — Borneo: Brunei, East Kalimantan, Sabah, Sarawak.

Habitat — Montane (mossy, e.g. *Ericaceae*) forest and submontane forest, at altitudes between 800–2000 m.

FICUS BENGUETENSIS AND F. LAEVICARPA

Identification of some recent *Ficus* collections from Sulawesi led to a re-evaluation of *F. schwarzii* Koord., as defined by Corner (1960b) and, hence, adopted for the Flora Malesiana treatment of the genus (Berg & Corner 2005). The concept proved to be wrong as it comprised several species of which one, comprising all material collected outside Sulawesi, is to be named *F. rosulata* C.C.Berg (in press). An account on the species of Sulawesi is in preparation. In the wake of this study attention was also paid to some *Ficus* species with short fig-bearing branchlets in the Philippines, in particular *F. benguensis*, as it shows affinities to the species mentioned above in the warty surface of the fig receptacle and the exfoliation of the epidermis, although not always, and if so, usually only of its upper part.

Examination of numerous specimens received for identification, from BRIT and K, and examined in A, L and NY, including the types of names based on material collected in the Philippines, *Ficus cuernosensis* Elmer (1908: 545), *F. laeviscarpa* Elmer (1912: 1395), *F. maquilangensis* Elmer (1919: 3094), and *F. peabodyi* Elmer (1911: 1267), which have been reduced to synonyms of *F. benguensis*, proved to belong to this species, except for the type of *F. laeviscarpa* and some other collections from Palawan.

The material to be included in *F. benguensis* is not quite uniform and, therefore, it is to some extent problematical to define the species. The majority of the collections represent material with the figs apparently confined to the leaf axils. A smaller proportion, including the types of *F. cuernosensis*, *F. peabodyi*, and *F. maquilangensis* bear figs (predominantly) on leafless, up to 15 cm (or to c. 30 cm?) long branchlets on the older wood, down to the base of the trunk (see Walker 1976: t. 10.). In these collections the leaf margin is often (but not always!) crenate-dentate. The weak correlation between cauliflory and dentation of the leaf margin makes it impossible to recognise formal infraspecific entities. The quality of the collections and label data do not provide information whether the predominant position of the figs is a matter of age and they also make it difficult to define the distribution of the two forms: both apparently occur throughout the range of the species, but the cauliflorous form may occur more frequently in the northern part of the range. It is remarkable that the latter form is scarce among recent collections. Material from Taiwan referred to *F. fistulosa* subsp. *fistulosa* by Liao (1995) belongs to *F. benguensis*, implying that *F. fistulosa* the former does not occur in Taiwan, as incorrectly stated by Berg & Corner (2005: 420).

***Ficus benguensis* Merr. (1905) 10.**

With the synonymy as given in Flora Malesiana (Berg & Corner 2005: 400), with exclusion of *F. laeviscarpa*, and the description revised.

Shrub or tree up to 12 m tall. *Leafy twigs* 3–4 mm thick, whitish hirtellous to strigillose to subhirtellous, nodal waxy glands present, internodes hollow, periderm mostly flaking off; older twigs usually with prominent scars of leaves and figs; often small conical abortive axillary buds. *Leaves* spirally arranged, (sub)opposite or (sub)distichous; lamina oblong to subobovate or to elliptic, (6–)8–19 by 3.5–8 cm, \pm asymmetric to almost symmetric, (sub)coriaceous, apex acuminate to subacuminate, base cuneate to rounded to subcordate, margin subentire or crenate-dentate, upper surface sparsely hairy on the midrib or the main veins to glabrous, smooth, lower surface \pm sparsely whitish strigillose, mainly on the lateral veins, smooth, cystoliths only beneath, lateral veins (4–)6–10 pairs, most or some of them branched or furcate away from the margin, basal pair up to 1/6–1/3 the length of the lamina, (faintly) branched, tertiary venation scalariform, waxy glands sometimes present in the axils of the lateral veins in the middle of the lamina beneath; petiole 1.5–3(–5) cm long, brown to whitish strigillose to hirtellous, the epidermis \pm flaking off; stipules 0.5–1.5 cm long, glabrous or whitish to brownish appressed-puberulous to strigillose, caducous. *Figs* on the trunk, down to near its base, on up to 15 (or to c. 30) cm long, branched or unbranched leafless branchlets with 3–4 mm long with terminally 3–4 mm long subsistent stipules; peduncle 0.2–1.5 cm long; basal bracts 3, verticillate, 2–3 mm long, often patent to \pm deflexed; receptacle depressed-globose to obovoid or to ovoid, 1–1.5 cm diam when dry, non-stipitate or c. 0.2 cm long stipitate, \pm sparsely puberulous to glabrous, often with some small rather conspicuous lenticels, epidermis persistent (or flaking off around the ostiole?), without lateral bracts, faintly to distinctly ribbed, reddish brown at maturity, apex \pm convex, ostiole 2–3 mm diam, surrounded by 5 (often \pm swollen) apical bracts, these and the ostiolar bracts usually minutely puberulous outside or at least ciliolate; internal hairs absent. *Style of long-styled pistillate flower* minutely hairy at the apex to glabrous.

Distribution — Ryu Kyu Islands, Taiwan, Malesia: Philippines (Leyte, Luzon, Mindanao, Mindoro, Negros, Panay, Samar). No indications that the species occurs in Palawan.

Habitat — Forest, at altitudes up to c. 1500 m.

***Ficus laeviscarpa* Elmer**

Ficus laeviscarpa Elmer (1912) 1395; Merr. (1923) 55. — Type: Elmer 12776 (iso L), Palawan, Puerto Princesa, (Mt Pulgar).

Tree up to 15 m tall. *Leafy twigs* 3–4 mm thick, whitish to brownish strigillose to subhirtellous, without nodal waxy glands, internodes hollow, periderm mostly flaking off; often with minute abortive axillary buds (also below the leaves). *Leaves* spirally arranged to subdistichous; lamina oblong, 12–24(–30) by 4–11 cm, \pm asymmetric to almost symmetric, coriaceous, apex acuminate, base cuneate to rounded, margin entire, upper surface sparsely whitish to brownish appressed-puberulous on the midrib or also on the lateral veins to (sub)glabrous, smooth, lower surface very sparsely whitish to brownish strigillose on the main veins, smooth, cystoliths only beneath, lateral veins 4–7 pairs, several of them branched or furcate away from the margin, basal pairs up to 1/4–1/2 the length of the lamina, (faintly) branched, tertiary venation scalariform, waxy glands present in the axils of the lateral veins in the middle part of the lamina beneath; petiole 1.5–3.5 cm long, whitish to brownish strigillose to subhirtellous, the epidermis flaking off; stipules 1–1.5 cm long, whitish to brownish strigillose and appressed-puberulous, caducous. *Figs* axillary (or on short

leafless branchlets on the larger branches, fide Elmer 1912), solitary or in pairs (pendant, according to Elmer 1912); peduncle 0.7–1.2 cm long; basal bracts 3, verticillate, 3–5 mm long, patent to \pm deflexed; receptacle subglobose to obovoid to ellipsoid, 1–1.5 cm diam when dry, non-stipitate, very sparsely whitish puberulous to glabrous, the epidermis persistent, faintly ribbed, without lateral bracts, colour at maturity unknown, apex \pm convex, ostiole 5–6 mm diam, surrounded by 5 apical bracts, these and the upper ostiolar bracts pointing upwards, form a rosette, the ostiolar bracts usually minutely puberulous outside or at least ciliolate; internal hairs absent. *Style of long-styled pistillate flower* glabrous.

Distribution — Malesia: Philippines (only Palawan).

Habitat — In rocky river beds and on rocky riverbanks, at low altitudes.

Additional collections examined. PALAWAN, Tatay, Bampanan, Mt Capoas, 160 m, Reynoso *et al.* PPI11179 (L); Pagdanan Range, Ibangley, Brookside Hill, 40 m, Ridsdale SMHI477 (L); Pagdanan Range, 10 km E of San Vicente, 170 m, Ridsdale SMHI1524A (L); Irawan River valley, nr. Benguet mine, 150 m, Soejarto 6094 (A); Puerto Princesa, Irawan, Tatanarum, Stone PPI.53; Puerto Princesa, Narra, La Estrella, Stone *et al.* PPI100; Panacan, Aborlan, Victoria Mts, Sulit 14791 = PNHI2454 (A).

Note — This species is clearly distinct in the structure of the ostiole with a rosette of bracts pointing upwards (as in *F. rosulata*, ined.) and also by the partly or predominantly whitish indumentum on various parts. The species is rheophytic according to the label of Ridsdale 1524.

FICUS FISTULOSA AND F. SEPTICA

The other species involved is *F. fistulosa*, in particular, its relation to *F. septica* and the material described as *F. lucbanensis* Elmer (1907: 254), a name reduced to a variety of *F. fistulosa* and according to Corner (1960b: 62) to be regarded as a possible hybrid between *F. fistulosa* and *F. septica*. Most of the collections Corner initially identified as *F. lucbanensis* have relatively small elliptic to oblong leaves (often shorter than 10 cm) and small figs, mostly 0.5–0.8 cm diam not or faintly ribbed, and sparsely and mainly at the upper part of the receptacle whitish warty spots. Corner even recognized specimens with brownish to whitish indumentum on the leafy twigs and the petioles (only or more densely adaxially) with the unpublished name var. *hirtella*. Entirely glabrous and partly hairy specimens are also found in material of *F. septica* with larger leaves. Material, also with small figs and small leaves, but narrow, being lanceolate to linear, was referred to *F. septica* under the name var. *salicifolia* (Corner 1960b: 62). As essential differences between the groups of specimens of the two types of leaves is so small that accommodating them in the same species, *F. septica*, is more correct than to have them placed in different species. Corner based his decision to include *F. lucbanensis* in *F. fistulosa* on the absence of ribbed receptacles as evident in *F. septica*. A reason to link *F. lucbanensis* to *F. fistulosa* could also have been the presence of more than two figs on short spurs in the axils of the lower leaves and also below the leaves. True cauliflory in *F. septica* is only found in the eastern part of the species range (see Corner 1960b: 61). The collections of *F. fistulosa* from the Philippines (Biliran, Luzon, Mindanao, Mindoro, Samar and Sibuyan) differ from the collections of *F. septica* in evident cauliflory, peduncles (1–1.5–3 cm long (vs up to 0.8 cm long), mostly stipitate receptacles without white warty spots, and reticulate tertiary venation (vs tending to subscalariform to loosely scalariform).

In the Philippines, *F. fistulosa* is quite uniform with regard to the position of the figs, being clearly cauliflorous, and features of the figs, being glabrous on all parts and the figs with long peduncles and with the receptacle stipitate. However, there is

variation in the laminas: they mostly have an entire margin, but the margin is sometimes sinuate to coarsely dentate to lobate, as in the types of *F. grandidens* Merr. (1914) and *F. repandifolia* Elmer (1906).

Elsewhere in the range, the species is more variable, as with regard to the size of the leaves, the tertiary venation (varying from reticulate to largely scalariform), the presence of indumentum on leafy twigs, petioles and the midrib of the lamina beneath. Moreover, and the position of the figs, that varies from (sometimes) axillary (on short spurs) to ramiflorous (with short spurs, bearing simultaneously only one or a few figs) to clearly cauliflorous, with (clusters of) fig-bearing branchlets, bearing simultaneously numerous figs. Ramiflorous material usually has small leaves, with the lamina often less than 10 cm long, with down to 5 pairs of lateral veins, and the petiole 1–2 cm long. This ramiflorous material resembles somewhat the collections which have been put in *F. (fistulosa* var.) *lucbanensis* and that might have been one of the reasons to include them in *F. fistulosa*. The ramiflorous material is found in the greater part of the species range (from Thailand to Java and to Borneo) shows transitions to the mostly large-leafed and cauliflorous form of *F. fistulosa*, nevertheless, the majority of the collections can be placed in one of two categories, and recognition as varieties might be appropriate: the small-leaved, ramiflorous form as var. *tengerensis* (Miq.) Kuntze and the large-leaved, cauliflorous one as var. *fistulosa*. Intermediates are occasionally encountered.

a. var. *fistulosa*

With all synonyms listed by Berg & Corner (2005: 418), except for *Covellia subopposita*, *F. lucbanensis* and *F. tengerensis*

Leafy twigs 2–4 mm thick. *Lamina* oblong to subobovate (to elliptic), 8–22(–35) by 3–9(–17) cm; apex acuminate, base cuneate to rounded (to subcordate); lateral veins 6–10(–13) pairs; petiole (1–)2–4(–10) cm long. *Figs* on spurs or up to 2.5 cm long leafless branchlets on main branches and trunk; peduncle 1–4.5(–6) cm long; receptacle 0.8–1.5 cm diam when dry.

Distribution — India (NE and Nicobar Islands), Sikkim, Bangladesh, Myanmar, S China, Vietnam, Cambodia, Thailand, Sumatra, Peninsular Malaysia, Java, Borneo, Philippines, N Sulawesi, Lesser Sunda Islands.

Ecology — Evergreen forest and secondary growth, at altitudes up to 1 700 m.

b. var. *tengerensis* (Miq.) Kuntze

Ficus fistulosa var. *tengerensis* (Miq.) Kuntze (1891) 626; Kochummen (1978) 147. — *Covellia subopposita* Miq. (1851) 66 — Type: *Junghuhn s.n.* (holo U), Indonesia, Java, Preanger.

Covellia tuberculata Miq. (1854) 94, 99. — *Ficus tengerensis* Miq. (1867) 283, 296. — Type: *Zollinger s.n.* (holo U), Indonesia, Java, Mt Tengger, 4000'.

Ficus fistulosa var. *cincta* Hochr. (1925) 331. — Type: *Hochreutiner 2506* (holo G), Indonesia, Java, between Dieng and Bawang, 1950 m.

Leafy twigs 1–2 mm thick. *Lamina* subobovate (to oblanceolate), 4–17 by 2–5 cm, apex (sub)caudate, base cuneate to obtuse to cuneate; lateral veins 4–6 pairs; petiole 1–1.5 cm long. *Figs* axillary or on short spurs below the leaves; peduncle 0.5–1 cm long; receptacle 0.5–1 cm diam when dry.

Distribution — Thailand, Sumatra, Malay Peninsula, Java, Borneo, Lesser Sunda Islands (Flores).

Ecology — Evergreen forest, at altitudes up to 2000 m.

KEY FOR THE SPECIES TREATED ABOVE FOR THE PHILIPPINES

1. Peduncle (1–)1.5–3 cm long; fig receptacle often stipitate; tertiary venation of lamina reticulate *F. fistulosa*
1. Peduncle up to 1.5 cm long; receptacle non-stipitate; tertiary venation of lamina scalariform or tending to scalariform . 2
2. Indumentum on various parts predominantly whitish; ostiole rosulate *F. laevicarpa*
2. Indumentum on various parts predominantly brownish; ostiole flat 3
3. Lamina glabrous or hairy only at the base of the midrib beneath; figs axillary; surface of the receptacle whitish lenticellate and the epidermis not exfoliating *F. septica*
3. Lamina (sparsely) hairy at least on the main veins beneath and the midrib above; figs axillary on leafless branchlets on the older wood; surface of the receptacle, brownish lenticellate and the epidermis often exfoliating . . . *F. benguetensis*

NOMENCLATURAL CORRECTIONS

Two names of species described by Elmer (1937) in English and applied by Berg & Corner (2005) need validation:

Ficus peninsula Elmer ex C.C.Berg

Fico apiocarpa similis, e.g. folii venis basalibus brevioribus non vel leviter ramosis, venis lateralibus ceteris rare ramosis vel furcatis differt. — Typus: A.D.E. Elmer 16116 (holo PNH still present?; iso L), Philippines, Luzon, Sorsogon, Irosin, May 1916.

And (p. 606)

Ficus prasinicarpa Elmer ex C.C.Berg

Fico saxophila similis, pedunculis brevis, fici bracteas basalibus et ostiolaribus sine pilis differt. — Typus: A.D.E. Elmer 16129 (holo PNH, still present?; iso L), Philippines, Luzon, Sorsogon, Irosin, May 1916.

The other names in the same publication and included in the synonymy of several species (Berg & Corner 2005, with a page number of each of them) species should be regarded as nomina nuda: *F. auranticarpa* (p. 652), *F. bulusanensis* (p. 540), *F. castanea* (p. 408), *F. collinsii* (p. 236), *F. compressitora* (p. 349), *F. crasicalyx* (p. 644), *F. ilangoides* (p. 349), *F. irosinensis* (p. 236), *F. olivacea* (p. 432), *F. pacifica* (p. 654), *F. rubrocarpa* (p. 544), *F. silvestrei* (p. 642) and *F. sorsogensis* (p. 405).

The later homonym of *F. cuneata* Blume should not have been applied by Berg & Corner (2005: 415) and is herewith for this species replaced by a new name:

Ficus cuneiformis C.C.Berg.

Based on *Covellia cuneata* Miq., London J. Bot. 7 (1848) 466, t. 8B. — *Ficus cuneata* (Miq.) Miq. (1867) 297, non Blume (1825), nec Hoffmanns. (1828), nec H.Lév. & Vaniot (1907). — Type: *Cuming* 1938 (holo L), Philippines.

Acknowledgements The author is indebted to Mrs. Melanie Thomas (Kew) for supplying information about types in the K herbarium and to Mr. R.H.A. Govaerts (Kew) for drawing my attention to incorrect use of some names in Berg & Corner (2005). Dr. J.F. Veldkamp (Leiden) translated the diagnoses into Latin.

REFERENCES

- Berg CC, Corner EJH. 2005. Moraceae, Ficus. Flora Malesiana, Ser. I, 17/2. Nationaal Herbarium Nederland, Leiden
- Blume CL. 1825. Bijdragen tot de flora van Nederlandsch Indië. Batavia.
- Corner EJH. 1960a. Taxonomic notes in Ficus Linn., Asia and Australasia, III. Subg. Ficus and sect. Ficus. Gardens Bulletin Singapore 17: 416–441.
- Corner EJH. 1960b. Taxonomic notes in Ficus Linn., Asia and Australasia, VI. Subg. Ficus sect. Sycocarpus Miq. Gardens Bulletin Singapore 18: 36–64.
- Corner EJH. 1965. Check-list of Ficus in Asia and Australasia, with keys to identification. Gardens Bulletin Singapore 21: 1–186.
- Elmer DE. 1906. A fascicle of Benguet figs. Leaflets of Philippine Botany 1: 42–62.
- Elmer DE. 1907. A fascicle of Tayabas figs. Leaflets of Philippine Botany 2: 236–261.
- Elmer DE. 1908. A fascicle of South Negros figs. Leaflets of Philippine Botany 2: 531–551.
- Elmer DE. 1911. A fascicle of Davao figs. Leaflets of Philippine Botany 4: 1231–1270.
- Elmer DE. 1912. A fascicle of Palawan figs. Leaflets of Philippine Botany 4: 1363–1397.
- Elmer DE. 1919. New woody plants from Mount Maquiling. Leaflets of Philippine Botany 8: 3069–3105.
- Elmer DE. 1937. Fascicle of Sorsogon figs. Leaflets of Philippine Botany 9: 3397–3487.
- Hochreutiner BPG. 1925. Plantae Hochreutineranae, fascicle II. Candolea 2: 317–513.
- King G. 1888. The species of Ficus of the Indo-Malayan and Chinese countries. Annals of the Royal Botanic Garden (Calcutta) 1, 2: 67–185, t. 88–232.
- Kochummen KM. 1978. Moraceae. In: Ng FSP, Tree Flora of Malaya 3: 119–168.
- Kuntze CEO, 1891. Revision Generum Plantarum 1. Arthur Felix, Leipzig.
- Léveillé AAH, Vaniot E. 1907. Los Ficus de China. Memorias de la Real Academia de Ciencias y Artes de Barcelona, ser. 3, 6: 147–153.
- Liao J-C. 1995. The taxonomic revisions of the family Moraceae in Taiwan, ed. II. National Taiwan University, Department of Forestry, Taipei.
- Merrill ED. 1905. New or noteworthy Philippine plants III. Publications of the Bureau of Science Government Laboratories 29: 5–50.
- Merrill ED. 1914. New or noteworthy Philippine plants. Philippine Journal of Science. Section C, Botany 9: 261–292.
- Merrill ED. 1921. A bibliographic enumeration of Bornean plants. Journal of the Straits Branch of the Royal Asiatic Society, Special number: 1–637.
- Merrill ED. 1923. Moraceae. An enumeration of Philippine flowering plants 2: 36–72.
- Miquel FAW. 1848. Prodromus monographiae Ficuum. The London Journal of Botany 7: 64–78, 109–116, 221–236, 425–471.
- Miquel FAW. 1851. Plantae Junghuhnianae. Leiden
- Miquel FAW. 1854. Monochlamydeen. In: Zollinger H, Systematisches Verzeichniss der im indischen Archipel in den Jahren 1842–1848 gesammelten sowie der aus Japan empfangenen Pflanzen 2: 81–107. Zürich.
- Miquel FAW. 1867. Annotationes de Ficus speciebus. Annales Musei Botanici Lugduno-Batavi 3: 260–300.
- Ridley HN. 1915. Moraceae. In: Gibbs LS, A contribution to the flora and plant formations of Mount Kinabalu and the highlands of British North Borneo. Journal of the Linnean Society, Botany 42: 136–138.
- Von Hoffmannsegg JC. 1828. Verzeichniss der Pflanzenkulturen in den Gräfl. Hoffmannseggischen Garten zu Dresden und Rammenau... 2. Nachtrag. Dresden.
- Walker EH. 1976. Flora of Okinawa and southern Ryukyu Islands. Smithsonian Institution Press, Washington, DC.