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Precursory taxonomic studies on *Ficus* (Moraceae) for the Flora of Thailand

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ABSTRACT. Twenty, for the greater part, more or less problematic or reinstated species of *Ficus* found in Thailand are described and/or discussed. Six new combinations are made and one new subspecies is described: *Ficus anserina* (Corner) C.C.Berg, *Ficus geniculata* Kurz var. *insignis* (Kurz) C.C.Berg, *Ficus glaberrima* Blume subsp. *siamensis* (Corner) C.C.Berg, *Ficus ochracea* (C.C.Berg) C.C.Berg, *Ficus saxophila* Blume subsp. *cardiophylla* (Merr.) C.C.Berg, *Ficus subpisocarpa* Gagnep. subsp. *pubipoda* C.C.Berg, and *Ficus triloba* Voigt subsp. *quangtriensis* (Gagnep.) C.C.Berg. Lectotypes for *Ficus lacor* Buch.-Ham., *Ficus subpisocarpa* Gagnep., and *Ficus talbotii* King are designated.

KEYWORDS: *Ficus*, Moraceae, Thailand.

INTRODUCTION

In connection with the preparation of the treatment of *Ficus* and the other genera of Moraceae for the Flora of Thailand 20 *Ficus* species are presented herein for a variety of taxonomic reasons: reinstatement of the species, recognition of infraspecific taxa, redefinition of species, peculiar features, or possible occurrence in the country. In several cases the decisions affect the taxonomy as presented in the recently published treatment for Flora Malesiana (Berg & Corner, 2005). Distributions of species in Thailand will be provided in the Flora of Thailand treatment.

TAXONOMY

1. Ficus anastomosans (subg. Sycidium)

This species was reduced to a variety of *Ficus tinctoria* G. Forst. by Corner (1960), but reinstated as a species in Flora Malesiana (Berg & Corner, 2005). This species, also found in the Celebes, is rather common in Thailand on exposed limestone rocks, as shrubs or treelets, or sometimes subscandent against rock surfaces.

Ficus anastomosans Wall. ex Kurz, J. Asiat. Soc. Bengal 42(2): 107. 1873, as anastomozans; Kurz, Forest Fl. Burma 2: 455. 1877; C.C.Berg & Corner, Fl. Males. 17(2): 264. 2005. Type: Burma, Kogun, *Wallich* 4513 (holotype **K**).— *F. tinctoria* G. Forst. subsp. *parasitica* (Miq.) Corner var. *anastomosans* (Wall. ex Kurz) Corner, Gard. Bull. Singapore 17: 477.

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1960.— *F. ampelas* Burm.f. var. *hispidula* Corner, Gard. Bull. Singapore 18: 89. 1961. Types: Indonesia, Sulawesi, Pankadjene, *Teijsmann* 11905 (syntype **BO**) & 12242 (syntype **BO**). Fig. 1.

Shrub or treelet, terrestrial, sometimes subscandent. *Branchlets* drying (dark) brown. *Leafy twigs* 1–2 mm thick, rather densely puberulous, smooth; internodes solid. *Leaves* distichous; lamina oblong to elliptic to (sub)ovate, 1–10(–13) by 0.5–4.5 cm, ± asymmetric to (almost) symmetric, chartaceous to subcoriaceous, apex acute to obtuse (or to subacuminate), base (almost) equilateral, rounded to obtuse, margin crenate-dentate to sublobate, plane to slightly revolute towards the base; upper surface hispidulous, on the main veins to puberulous, ± scabrous, dull, lower surface sparsely (sub)hispidulous, on the main veins to puberulous, scabrous to almost smooth; cystoliths on both sides; midrib plane above; lateral veins 2–9 pairs, the basal pair running (rather) close to the margin, to (1/10–)1/5–1/3 the length of the lamina, unbranched or faintly branched, other lateral veins often forked away from the margin, tertiary venation reticulate to subscalariform; waxy glands in the axils of both lateral veins or also in the axils of some other lateral veins; petiole 0.2–1 cm long, puberulous, the epidermis flaking off; stipules amplexicaul, 0.2–0.3 cm long, puberulous, caducous. *Figs* axillary or just below the leaves, solitary; peduncle 0.1–0.2 cm long; peduncular bracts 3, scattered, 0.5–1 mm long; receptacle (sub)globose, 0.3-0.4 cm diam. when dry, puberulous to subhispidulous, scabridulous to almost smooth, sometimes (?) with a lateral bract, yellow to red at maturity, apex ± umbonate, ostiole ca 1 mm diam., surrounded by a rim; internal hairs minute and sparse. *Tepals* pinkish, glabrous. *Styles* glabrous.

Distribution.— Burma, Thailand, Indonesia (Sulawesi: near Pankadjene, type).

Ecology.— On exposed limestone rocks, at altitudes to 850 m.

Note.— Two collections (*Kerr* 2510, 5239) being climbers, or possibly so, are not included in the description: the (larger) leaves are more pronouncedly asymmetric and the lamina can be irregularly lobate; in other features they are similar.

2. Ficus anserina (subg. *Synoecia*)

Ficus pubigera Miq. var. *anserina* Corner (1960) is, for example, in the venation of the lamina and in its cauliflory, so distinct from *F. pubigera*, even from its form with large figs, that only the rank of species is justified. This species differs from *Ficus pubigera* in the smaller number of lateral veins of which the basal pair are distinctly branched and to 1/3–1/2 the length of the lamina, the persistent epidermis of the petiole, and the distinctly pedunculate figs.

Ficus anserina (Corner) C.C.Berg, **comb. et stat. nov.**— *F. pubigera* (Miq.) Miq. var. *anserina* Corner, Gard. Bull. Singapore 18: 5 (1960). Type: Laos, Muang, Aum, Chieng Kwang, *Kerr* 20955 (holotype **BM**; isotype **P**). Fig. 2.

Root-climber (or treelet to 5 m tall). *Branchlets* drying brown. *Leafy twigs* 3–5 mm thick, densely brown subvillous. *Leaves* in lax spirals to subdistichous; lamina oblong to subovate, 24–40 by 10–20 cm, (almost) symmetric, subcoriaceous to coriaceous, apex

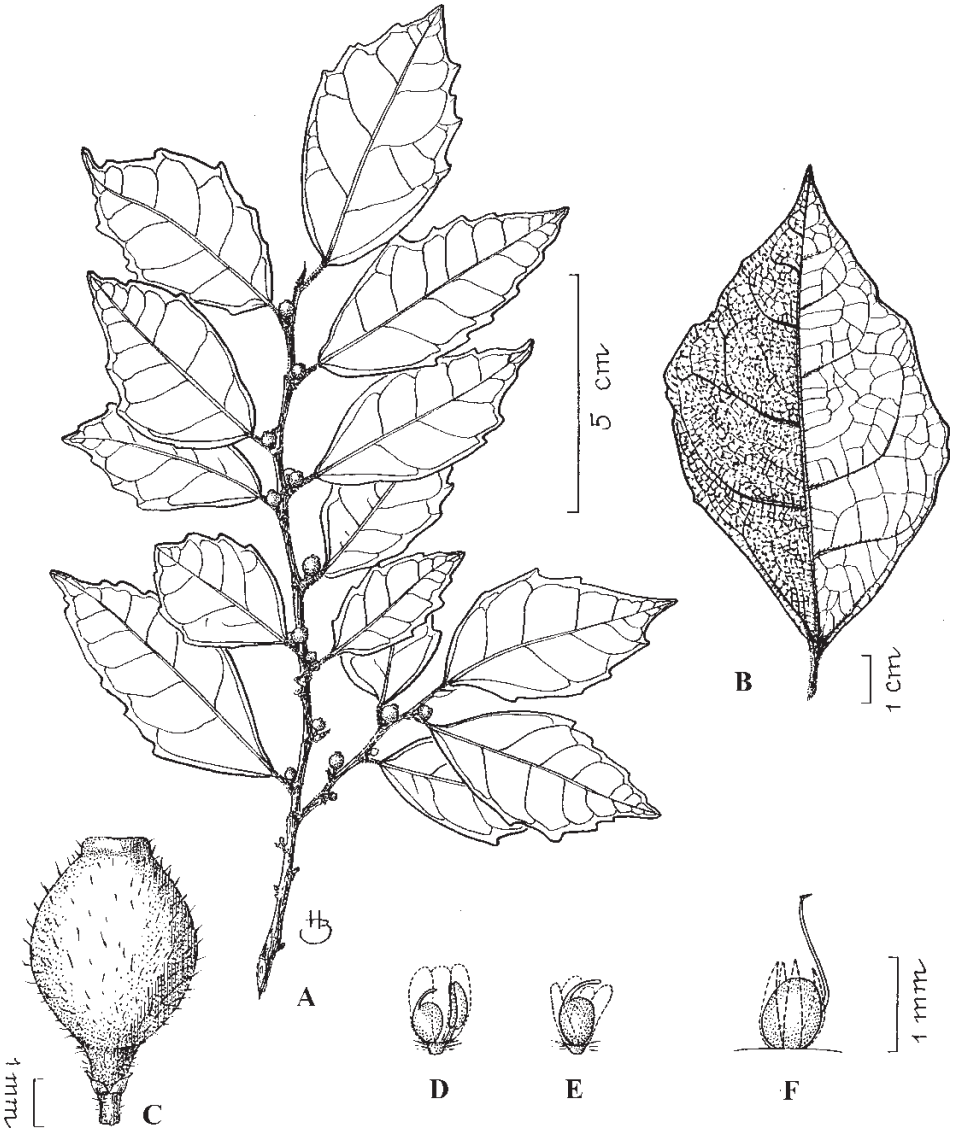

Figure 1. *Ficus anastomosans* Kurz. A. leafy twigs with figs; B. leaf; C. fig; D. staminate flower. E. Short-styled pistillate flower; F. long-styled pistillate flower. A and C-F from *Maxwell* 91-603 (L); B from *Kerr* 5329 (L). Drawn by Hendrieke Berg.

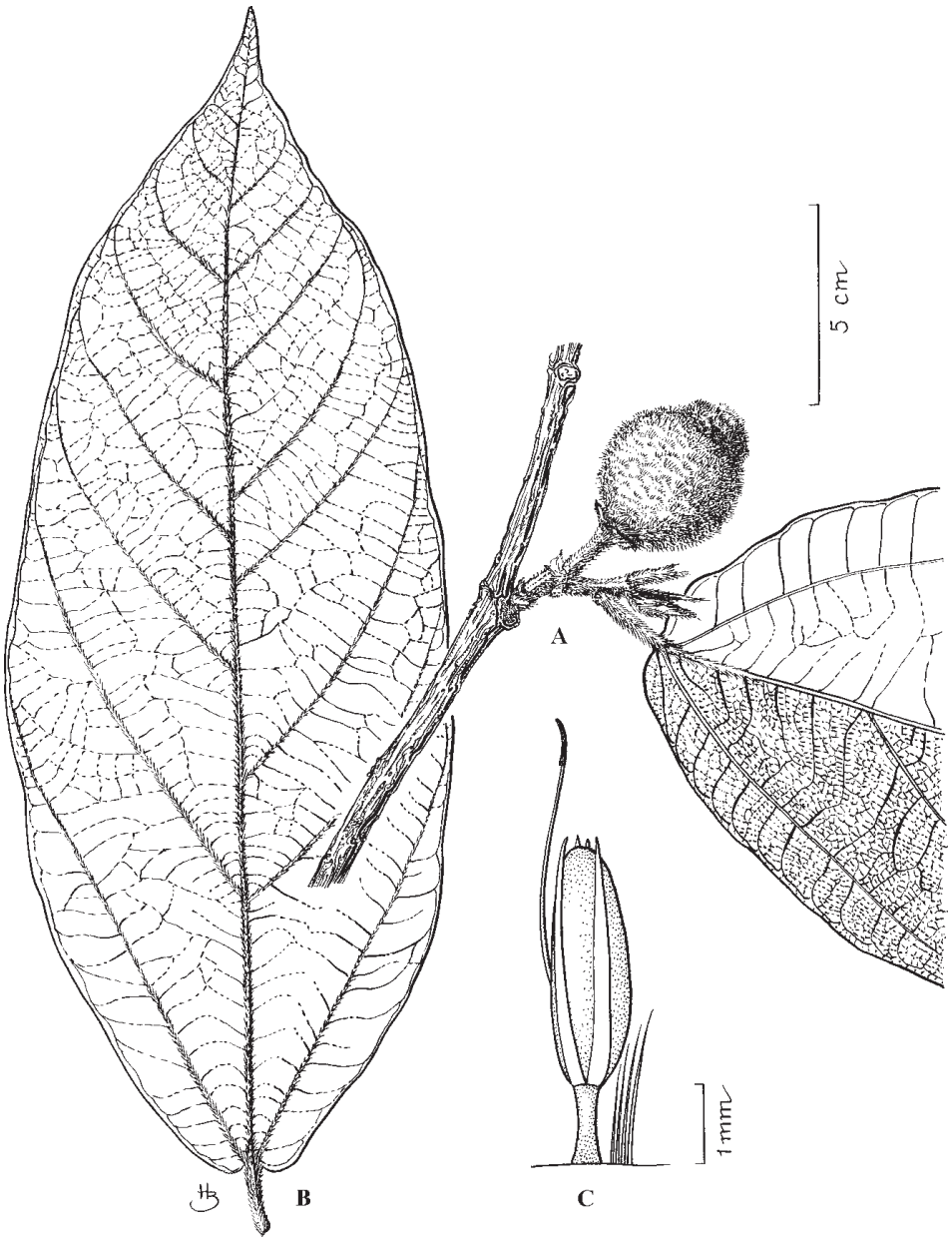

Figure 2. *Ficus anserina* (Corner) C.C.Berg. A. branch with fig-bearing leafy twig; B. leaf; C. long-styled pistillate flower and internal hairs. All from *Maxwell* 89-577 (L). Drawn by Hendrieke Berg.

acuminate, base (almost) equilateral, cordate to rounded, margin entire; upper surface brownish puberulous to strigillose mainly on the main veins, lower surface densely brown appressed-pubescent to -puberulous, on all veins or mainly on the main ones; cystoliths only beneath; lateral veins 6–8 pairs, the basal lateral veins to ca (1/4–)1/3–1/2 the length of the lamina, branched, tertiary venation subscalariform, the smaller veins prominent beneath; waxy glands in the axils of the basal lateral veins (or also in the axils of some other lateral veins); petiole 0.5–2 cm long, brownish appressed-puberulous to -pubescent, epidermis persistent; stipules (0.5–)1–1.5 cm long, brown to yellowish subsericeous, subpersistent or caducous. *Figs* below the leaves (on previous season's growth or older wood and then on to ca 2 cm long short-shoots, solitary; peduncle 1.5–4 cm long; basal bracts 3–5 mm long, often ± scattered on the peduncle to the base of the receptacle, persistent; receptacle (sub)globose to ovoid to ellipsoid, when dry 2.5–5 cm, non-stipitate or to 1.5 cm long stipitate, densely brown subvillous, at maturity green to yellow or to red (?), apex ± umbonate, ostiole ca 3–4 mm diam.; internal hairs abundant, long, stiff, and brownish. *Tepals* red, glabrous. *Stamens* not seen.

Distribution.— China (Yunnan), Laos, Thailand.

Ecology.— In evergreen forest, at altitudes to 1100 m.

3. Ficus arnottiana (sub. *Urostigma*)

Ficus arnottiana is a ramiflorous species from Central and South India and Sri Lanka. Three collections from Thailand, from exposed limestone rocks, largely match the vegetative characters of the species, in particular those of material included in var. *courtallense* by Miquel (1867) and King (1887) which has subsessile figs and is not clearly ramiflorous. The three collections deviate somewhat in the shorter basal lateral veins which in the typical material can be to 1/3 the length of the lamina. The three Thai collections match several collections from peninsular India as *Wight* 2630 (E) and 2724 (C, K). The differences in the material now included in *F. arnottiana* may provide a base for the distinction of infraspecific taxa or of more than one species.

Ficus arnottiana (Miq.) Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 287. 1867; King, Ann. Roy. Bot. Gard. (Calcutta) 1(1): 56, t. 68A. 1887; Corner, Gard. Bull. Singapore 21: 11. 1965.— *Urostigma arnottianum* Miq., London J. Bot. 6: 564. 1847. Type: India, *Wight* 1910 (not yet traced).— *U. courtallense* Miq., London. J. Bot. 6: 564. 1847. Type: India, Courtallum, *Wight 2628 = 1836, no. 942* (isotype ?**E**).— *Ficus arnottiana* (Miq.) Miq. var. *courtallensis* (Miq.) Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 287. 1867; King. Ann. Roy. Bot. Gard. (Calcutta) 1(1): 56, t. 68B. 1887.

Shrub or tree to 10 m m tall, hemi-epilithic, deciduous. *Branches* drying pale to dark brown, periderm ± flaking off. *Leafy twigs* 2–4 mm thick, slightly angular to subterete, glabrous or (minutely) white puberulous. *Leaves* spirally arranged; lamina cordiform to ovate (to elliptic), 4–9 by 2.5–5.5 cm, coriaceous, apex acuminate (with an obtuse acumen) to obtuse, base cordate to rounded; upper surface glabrous or minutely white puberulous on the midrib, lower surface glabrous; cystoliths only beneath; lateral veins 5–7(–8) pairs, the basal pair to 1/10–1/6 the length of the lamina, unbranched or branched, tertiary venation

reticulate to subscalariform, this and smaller veins flat and rather obscure; waxy gland at the base of the midrib; petiole (1–)1.5–5 cm long, glabrous or (minutely) white puberlous, the epidermis persistent; stipules 0.4–0.7 cm long, whitish puberulous, caducous. *Figs* axillary and (on minute spurs) just below the leaves, in pairs or solitary, (sub)sessile (the peduncle to 0.1 cm long); basal bracts 3, 1.5–2 mm long, ciliolate (or minutely puberulous at the base), sooner or later caducous or persistent (?); receptacle subglobose, 0.4–0.7 cm diam. when dry, (sub)glabrous, at maturity orange, apex convex, ostiole 2–2.5 mm diam., slightly prominent to flat; internal hairs present. *Staminate flowers* ostiolar. *Tepals* reddish. *Ovary* red-brown.

Distribution.— Sri Lanka, India, Thailand.

Ecology.— On limestone, in crevices and in scrub forest, at low altitudes.

Notes.— The type of *Ficus arnottiana* var. *costata* Corner, Gard. Bull. Singapore 17: 379. 1960 is currently included in *F. glaberrima* subsp. *siamensis* (Corner) C.C.Berg (see below).

It is not quite clear whether the basal bracts are always caducous or can be persistent.

The specimen *Middleton* et al. 1178 differs from the other Thai collections of the species, *Kerr* 11383 and *Maxwell* 9729, and from all other collections included in the species by the presence of puberulous indumentum on the midrib of the lamina above, the petiole, the leafy twig, the peduncle, the base of the basal bracts, and sparsely on the receptacle. The specimen *Garrett* 1184 (from Doi Chiang Dao, at 1750 m) resembles the *Middleton* collection in the presence and distribution of indumentum, but differs in the clearly visible tertiary and quarternary venation of the lamina beneath; it is not included in the description above.

4. Ficus assamica (subg. *Sycidium*)

Ficus assamica was reduced to a variety of *F. heterophylla* L.f. by Corner (1965). However, there are sufficient differences with *F. heterophylla* s.str, as in the length of the petiole and venation of the lamina, to reinstate it as species.

Ficus assamica Miq., London J. Bot. 7: 226. 1848.— *F. repens* Roxb. ex Willd. var. *assamica* (Miq.) Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 290. 1867.— *F. heterophylla* L.f. var. *assamica* (Miq.) Corner, Gard. Bull. Singapore 21: 73. 1965.— *F. grossularioides* Burm.f. forma *assamica* (Miq.) Kuntze, Revis. Gen. Pl. 1: 626. 1891.— *F. repens* Roxb. ex Willd., Sp. Pl. 4: 1149. 1806, non Rottl., 1803.— *F. heterophylla* L.f. var. *repens* (Roxb. ex Willd.) King, Ann. Roy. Bot. Gard. (Calcutta) 1(2): 77, t. 94, fig. 3 and 4. 1888; Gagnepain, Fl. Indo-Chine 5: 776. 1928.— *F. rubifolia* Griff., Not. Pl. Asiat.. 4: 399. 1854.; Griff, Ic. Pl. Asiat. 4: t. 557, III. 1854. Fig. 3.

Shrub to 3(–6) m tall, often prostrate (creeping or scandent) and rooting on the branches; branchlets drying brown. *Leafy twigs* 1–2.5 mm thick, sparsely whitish puberulous to subhispidulous, smooth; internodes hollow. *Leaves* distichous; lamina cordiform to ovate, 3–15 by 1–10 cm, symmetric or ± strongly asymmetric, chartaceous, apex acute to rounded, base equilateral or inequilateral, (sub)cordate, margin (coarsely) dentate (to crenate), often ± revolute; juvenile leaves often palmately 3–5-lobate; upper surface (minutely) hispidulous

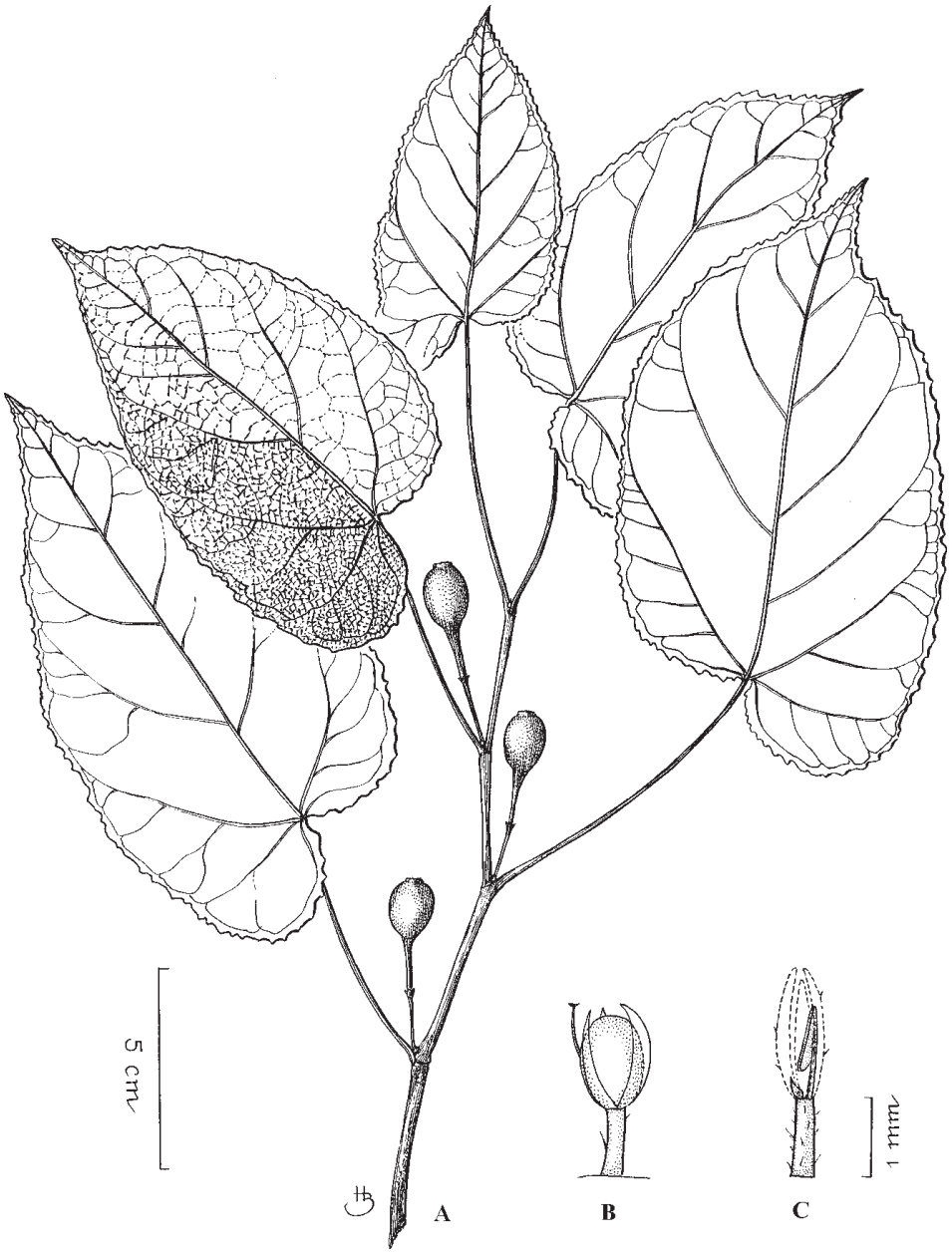

Figure 3. *Ficus assamica* Miq. A. leafy twig with figs; B. short-styled pistillate flower; C. staminate flower. All from *van Beusekom* et al. 99 (L). Drawn by Hendrieke Berg.

to strigillose, (±) scabrous, lower surface sparsely minutely to rather densely hispidulous to subhirtellous, scabrous or scabridulous; cystoliths on both sides; lateral veins 3–4(–5) pairs, the basal lateral veins to ca 1/3–1/2 the length of the lamina, branched, tertiary venation (sub)reticulate; waxy glands in the axils one of the basal lateral veins or absent; petiole 1–10 cm long, 1–2 mm thick, white puberulous, the epidermis persistent; stipules semi-amplexicaul, 0.3–0.5 cm long, subglabrous, caducous (or subpersistent). *Figs* axillary, solitary; peduncle 0.2–2 cm long; peduncular bracts 3, in a whorl, 0.5–1 mm long; receptacle (sub)globose to ellipsoid, when dry 0.8–1.5 cm in diameter, to 2.5 cm long stipitate, rather densely hispidulous to puberulous, ± scabrous, without lateral bracts, red at maturity, apex convex to slightly umbonate, ostiole c. 3 mm in diameter, surrounded by 4–6 ± swollen apical bracts; internal hairs absent. *Tepals* whitish, glabrous or minutely hairy at the apices. *Styles* glabrous or hairy. *Fruits* not seen.

Distribution.— India, Bangladesh, Sikkim, Bhutan, Burma, S China, Cambodia, Thailand.

Ecology.— In forest floor, mostly along rivers, at low altitudes.

Note.— The stipules are probably only subpersistent in juvenile material.

5. Ficus auriculata (subg. *Sycomorus*)

During the preparation of the subgenus for the Flora of Thailand several collections were (possibly incorrectly) referred to *Ficus hainanensis* Merr. & Chun.. This material was regarded as distinct from *F. auriculata* at least in having the figs only borne on branches departing from the base of the trunk.Whereas collections included in *F. auriculata* Lour. bear figs on spurs, to 10 cm long leafless branchlets, or on woody tubercles on the trunk and main branches and comprised material with laminas varying from cordiform to broadly elliptic to oblong to (ob)lanceolate: therefore, including, by implication, most material referred to *Ficus oligodon* Miq by Corner. Recent field work in western Thailand made it clear that there exists an entity which typically has (ob)lanceolate laminas and figs predominantly borne on to 2 m long branched or unbranched rooting branches departing from the base of the trunk mainly downstream and with depressed-globose (to almost discoid) receptacles (3.5–4.5 cm in diam. when fresh) and peduncles 0.5–1 cm long. Moreover, leaves tend to be tufted towards the apex of leafy twigs and stipules to be subpersistent, and one or few to 40 cm long fig-bearing branches can be found formed on the trunk or main branches. The stolon-like branches often become orthotropic and leafy. The stoloniflorous specimens vary from shrubs to trees to ca 5 m tall. In some populations of such shrubs and trees, specimens may occur that show features transitional to those of typical *F. auriculata*. In this entity in the trees that become larger, laminas are cordiform to broadly elliptic, figs are only borne on the trunk and main branches and have long(er) peduncles and often larger pyriform receptacles, leaves are regularly spaced on leafy twigs, and stipules are caducous. The intermediates may have leaves that are partly tufted or regularly spaced, laminas with the same shape as the stoloniflorous entity or broader, figs only borne on the trunk and/or main branches on spurs, woody tubercles, or leafless branchlets to 10 cm or long (or even to 40 cm long and to branched or unbranched) with longer peduncles and pyriform receptacles. The stoloniflorous entity is ecologically clearly linked to limestone rock and running water (as waterfalls). *F. auriculata* does not show this

narrow ecological amplitude. It is not clear from the data at hand whether the stoloniflorous specimens represent a distinct species or an infraspecific ecologically and morphologically distinct entity within *F. auriculata.* Awaiting further studies the best (provisional) solution appears to be to treat the stolonoflorous and calciphilous material as a distinct form (or ecospecies) of *F. auriculata*. It is not clear whether the types of *Ficus oligodon* and *F. hainanensis* represent the stoloniflorous form or are found at sites with running water on or among limestone rocks or intermediate forms. The stoloniflorous form is also known from Vietnam (*Balansa* 754, 3903, 3906, 3907 at P; *Hiep* 3027 at L), but indications about the habitat in which they have been collected are lacking.

A. Cauliflorous (auriculata s. str.) form

Trees to 15(–20) m tall. Leaves spaced apart (as internodes are rather similar in length); lamina cordiform to broadly ovate or elliptic, (6–)10–30(–40) by (3–)7–25(–32) cm, base cordate to rounded; stipules caducous. Figs in leafless (spur-like) branchlets or woody tubercles on the trunk and main branches to 5(–10) cm long; peduncle (1–(2–8 cm long; basal bracts 2–7 mm long; receptacle subpyriform to subglobose to depressed-globose, 2–6 cm diam. when dry, to 10 cm diam. when fresh, non-stipitate or to 1.5 cm long stipitate, mostly distinctly ribbed; ostiole 4–12 mm diam. when dry.

B. Stoloniflorous (and calciphilous) form

Shrubs or trees to 6 m tall, with a wide crown and a short trunk. Leaves often ± tufted (due to different length of internodes); lamina (ob)lanceolate to oblong, (5–)10–30(–37) by (1.5–)3–10(–18) cm, base cuneate to rounded; stipules often subpersistent (on twig parts with short-internodes). Figs on rooting (branched or unbranched) branches to 2 m long departing from the base of the trunk (or also few to 40 cm long fig-bearing branchlets on the trunk and/or main branches); with a peduncle 0.5–1 cm long (or subsessile); bracts 1–3 mm long; receptacle discoid to subpyriform, 1.5–2.5 cm diam. when dry, 2.5–4.5 cm diam. when fresh, non-stipitate or to 0.5 cm long stipitate, not or faintly ribbed, ostiole 3–5 mm diam. when dry, to 10 mm when fresh.

C. Intermediate forms:

a. on limestone and in running water, as form **A** but cauliflorous and figs on branched or unbranched leafless branchlets to 40 cm long, often with longer peduncles and receptacle subpyriform to subglobose and/or the leaves spaced on the twigs, the lamina oblong;

b. in other habitats, intermediates as with regard to shape of the lamina, dimensions of the receptacle, length of the peduncle, length of the basal bracts, are included in the description of form **A**, which also shows considerable variation in the perianth of the pistillate flower.

Further research may reveal the mechanism(s), creating this morphological and ecological complexity, which cannot yet be sorted out by a formal taxonomic approach.

Ficus auriculata Lour., Fl. Coch. 2: 660. 1790; Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 296. 1867; Merr. & Chun, Sunyatsenia 2: 216. 1935; Corner, Gard. Bull. Singapore 19: 395. 1962; Corner, Philos. Trans., Ser. B, 281: 383, t. 7. 1978; C.C.Berg & Corner, Fl. Males. 17(2):

341. 2005.— *Ficus macrophylla* Roxb. & Buch.-Ham. ex Sm. in Rees, Cycl. 14: Ficus 32. 1810, non Desf. ex Pers, 1807.— *Tremotis cordata* Raf., Sylv. Tellur.: 59. 1838.— *Covellia macrophylla* (Roxb. ex Sm.) Miq., London J. Bot. 7: 465. 1848.— *Ficus roxburghii* Wall., Calc. Gard. Rep.: 33. 1840; Steud., Nomencl. Bot. ed. 2, 1: 637. 1840, non Miq., 1848.— *F. sclerocarpa* Griff., Not. Pl. Asiat. 4: 397. 1854; Griff., Ic. Pl. Asiat. 4: t. 558. 1854, as *scleroptera*.— *F. regia* Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 230, 296, 1867; Kurz, Forest Fl. Burma 2: 459. 1877.— *F. oligodon* Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 234, 297. 1867; Corner, Gard. Bull. Singapore 18: 43. 1960; Corner, Philos. Trans., Ser. B, 281: 383, t. 7. 1978.— *F. pomifera* Wall. ex King, Ann. Roy. Bot. Gard. (Calcutta) 1(2): 171, t. 215. 1888, non Kurz, 1873; Ridl., Fl. Malay Penins. 3: 350. 1924; Corner, J. Malayan Branch Roy. Asiat. Soc. 11: 46, f. 24. 1933. *F. hainanensis* Merr. & Chun, Sunyatsenia 2 (1935) 215; C.C.Berg & Corner, Fl. Males. 17(2): 343. 2005.

Shrub or tree to 15(–20) m tall, tall ones becoming shortly buttressed. *Leafy twigs* 2–10 mm thick, whitish to brownish (appressed-)puberulous to subtomentose or to glabrous, without nodal waxy glands; internodes hollow (or solid); periderm flaking off or persistent. *Leaves* spirally arranged to subdistichous; lamina cordiform to ovate to elliptic to oblong to subobovate or to suborbicular, (6–)10–30(–40) by (3–)7–25(–32) cm, symmetric, chartaceous to subcoriaceous, apex short-acuminate to acute, base cordate to rounded (to broadly cuneate), margin coarsely dentate to denticulate to subentire; upper surface glabrous or sparsely puberulous on the main veins, smooth, lower surface densely to sparsely puberulous on the veins or only on the main veins or glabrous; cystoliths on both sides; lateral veins 3–7 pairs, basal pair to ca 1/3–2/3 the length of the lamina, (usually) branched, tertiary venation (sub)scalariform; waxy glands in the axils of the (main) basal lateral veins or also smaller ones in the axils of other lateral veins; petiole 2–15(–30) cm long, whitish to brownish puberulous or glabrous, epidermis flaking off; stipules 1.5–3 cm long, densely to sparsely whitish to brownish appressed-puberulous to subsericeous or glabrous, caducous or subpersistent. *Figs* (cauliflorous) on (clusters of) spur-like leafless branchlets or on more elongate, unbranched or branched leafless branchlets on the trunk and main branches to 10(–40) cm long,, or (also) stoloniflorous) on unbranched or branched rooted branchlets to 2 m long (terminally becoming orthotropic and leafy); with a peduncle 0.5–8 cm long(or subsessile); basal bracts 3, verticillate (or ± scattered on the upper part of the peduncle), 1–7 mm long, persistent; receptacle subpyriform to subglobose to depressed-globose, 2–6 cm diam. when dry, to 10 cm diam. when fresh, 0–1.5 cm long stipitate, densely to sparsely brown to yellowsih to whitish puberulous to subtomentose to subvelutinous or subglabrous, with numerous strong to weak longitudinal ridges, occasionally with 1 or a few lateral bracts, red(dish), red-brown, orange, dark red or purple at maturity, apex ± concave to flat, ostiole 2–12 mm diam. with a prominent rosette of ostiolar bracts; wall 1–7 mm thick when dry; internal hairs minute and white or absent. *Perianth of the pistillate flower* tubular to 3-parted. *Styles* of the long-styled flowers glabrous or hairy.

Distribution.— Pakistan, N. India, Nepal, Sikkim, Bhutan, Burma, S. China, Laos, Vietnam, Cambodia, Thailand, Peninsular Malaysia.

Ecology.— In areas with evergreen forest, in Thailand at altitudes to ca 1500 m, in Burma to 2800(–3000?) m.

6. Ficus bistipulata (subg. *Ficus*)

The types of *Ficus bistipulata* Griff. and *Ficus silhetensis* Miq. belong to the same species of which numerous collections have been identified as *Ficus gasparriniana* Miq. var. *viridescens* (H. Lév. & Vaniot) Corner (1960), including types of several species listed by Corner (1965) under this variety, in some cases incorrectly so. The type of *Ficus gasparriniana* Miq., *W. Griffith s.n* (holotype K) from India (Assam), proves to belong to one of the forms of the variable *Ficus neriifolia* Sm.. The material Corner (1960) included in *F. gasparriniana* var. *esquirolii* (H. Lév. & Vaniot) Corner and var. *laceratifolia* (H. Lév. & Vaniot) Corner, represent distinct species. *Ficus esquirolii* H. Lév. & Vaniot (1907) is distinct in the acute (to subacuminate) apex, the more numerous lateral veins (than in the narrow-leaved form of *F. gasparriniana*), the tendency towards repand margins of the lamina, the usually hairy stipules, the usually distinctly pedunculate figs, and the hairy apices of the tepals. This species is found in southern China. *Ficus laceratifolia* H. Lév. & Vaniot (1907) is distinct in the lyrate and mostly dentate lamina, the relatively long petiole, less conspicuous (shorter and often sparser) of the indumentum on the lamina beneath, the stipules being hairy on the keel, and probably also by the pale tepals; the figs are mostly solitary, often distinctly pedunculate and the receptacle is often larger. This species is known from southern China and from Vietnam.

Ficus silhetensis Miq. var. *annamica* Gagnep. (1928) is based on a collection of *Ficus tuphapensis* Drake (1896).

It is not clear why Corner cited *F. bistipulata* both under *F. gasparriniana* var. *viridescens* and *F. glaberrima* (Corner, 1965: 17, 42) as the type, *Griffith* 4616 (K) from NE India, does not consist of different elements.

Ficus bistipulata Griff., Not. Pl. Asiat.. 4: 398. 1854; Griff., Ic. Pl. Asiat. 4: t. 559. 1854; King, Ann. Roy. Bot. Gard. (Calcutta) 1(2): 180. 1888. Type: India, "East Bengal", *Griffith* 4616 (holotype **K**).— *F. silhetensis* Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 223, 291. 1867; King, Ann. Roy. Bot. Gard. (Calcutta) 1(2): 154, t. 194. 1888. Type: India, Khasia, *Hooker & Thomson s.n.* (holotype **K**; isotype **K**).— *F. leekensis* Drake, J. Bot. 10: 212. 1896; Gagnep., Fl. Indochine 5: 797. 1928.— *F. cyanus* H. Lév. & Vaniot, Mem. Acad. Barcelona 6: 149. 1907.— *F. cyanus* H. Lév. & Vaniot var. *viridescens* H. Lév. & Vaniot, Mem. Acad. Barcelona 6: 149. 1907.— *F. gasparriniana* Miq. var. *viridescens* (H. Lév. & Vaniot) Corner, Gard. Bull. Singapore 17: 428. 1960.— *F. congesta* H. Lév., Fl. Kouy-Tchéou 429. 1914/1915.— *F. vaniotii* H. Lév., Fl. Kouy-Tchéou: 434. 1914/1915, fide Corner, Gard. Bull. Singapore 21: 42. 1965.— *F. comata* Hand.- Mazz., Anz. Akad. Wien, Math.-Nat. 58: 227. 1921, fide Corner, Gard. Bull. Singapore 21: 42. 1965.

Shrub to 5 m (or treelets to 6 m) tall, with internodes more or less clearly different in length and then the leaves ± tufted at the end of branches. *Leafy twigs* 1–2.5(–3) mm thick, ± densely whitish puberulous to hispidulous, smooth to ± scabrous; periderm persistent. *Leaves* spirally arranged; lamina subobovate to obovate or oblong to elliptic, 2–16 by 0.5–5.5 cm, chartaceous, apex acuminate, base obtuse to rounded, margin entire; upper surface white hispidulous to puberulous, ± scabrous, lower surface densely to sparsely white puberulous to subhispidulous on the veins, at least on the midrib hairs, usually with a

thickened and persistent base, scabrous to scabridulous; cystoliths only beneath; lateral veins 4–7 pairs, basal pair different from the other lateral veins, to 1/5–1/3 the length of the lamina, close to the margin, other lateral veins rarely branched or forked away from the margin, tertiary venation loosely scalariform to reticulate; waxy glands in the axils of the basal lateral veins; petiole 0.3–1.2 cm long, 1–1.5 mm thick, whitish puberulous to subhispidulous, ± scabrous to smooth, the epidermis persistent; stipules 0.3–1 cm long, amplexicaul or semi-amplexicaul (in twig parts with relatively long internodes), glabrous (or sparsely puberulous at the base and/or the midrib), caducous (or subpersistent in tufts at the apices of leafy twigs). *Figs* axillary or just below the leaves, in pairs (or solitary), (sub)sessile (or to 0.5 cm long pedunculate); basal bracts 3, 1–1.5 mm long, glabrous; receptacle subglobose, 0.4–0.9 cm diam. when dry, non-stipitate or to 0.2 cm long stipitate, sparsely to densely puberulous, at maturity red to dark purple, apex convex to slightly protracted, ostiole ca 2 mm diam., slightly prominent, the outer ostiolar bracts patent; internal hairs sparse, short. *Tepals* dark red, glabrous.

Distribution.— Sikkim, NE India, S China, Burma, Laos, Vietnam, Thailand.

Ecology.— In evergreen forest, near streams, at ca 1000 m (in Thailand; elsewhere between 500 and 1800 (to 2800 m).

Note.— This species shows similarities to *Ficus abelii* Miq., from which it clearly differs in the persistent epidermis of the petiole.

7. Ficus cambodica (subg. *Ficus*)

This species described by Gagnepain (1927) was together with *F. annamensis* of the same author reduced to a variety of *Ficus tuphapensis* Drake (1896) by Corner (1960). However, there are clear differences, as in the fully amplexicaul versus semi-amplexicaul to lateral stipules, the usually rounded to subcordate lamina base, the smaller fig receptacle, the unistaminate flowers, and glabrous styles, which justifies reinstatement of *Ficus cambodica*.

Ficus cambodica Gagnep., Notul. Syst. (Paris) 4: 87. 1927; Fl. Indo-Chine 5: 825. 1928.— *F. annamensis* Gagnep., Notul. Syst. (Paris) 85. 1927, Fl. Indo-Chine 5: 757. 1929.— *F. tuphapensis* Drake var. *annamensis* (Gagnep.) Corner, Gard. Bull. Singapore 17: 434. 1960.— *F. hirta* Vahl var. *brevipila* Corner, Gard. Bull. Singapore 17: 439. 1960.

Tree to 15 m tall, with intermittent growth. *Leafy twigs* 2–3 mm thick, densely brown puberulous; periderm persistent. *Leaves* in spirals; lamina subobovate to oblong, (3–)5–-17 by (1.5–)2.5–7.5 cm, chartaceous, apex acuminate, base cuneate to obtuse (to rounded), margin entire (to faintly denticulate towards the apex); upper surface puberulous to hispidulous on the main veins, ± scabrous, lower surface rather densely brown puberulous the veins, smooth; cystoliths absent (or sparsely only above); lateral veins 4–5 pairs, basal pair ± distinct from the other lateral veins, to 1/2–2/3 the length of the lamina, close to the margin and unbranched (or more distantly and branched), tertiary venation subscalariform to reticulate; waxy glands in the axils of the basal lateral veins; petiole 0.5–1.5(–3.5) cm long, 1-2 mm thick, densely brown puberulous, the epidermis persistent; stipules fully

amplexicaul, 0.5–0.6 cm long, brown (to pale yellowish) subsericeous, caducous. *Figs* below the leaves on previous season's growth, in pairs or solitary, subsessile; basal bracts 3, 1–1.5 mm long, puberulous; receptacle subglobose to ovoid, when dry 0.5–0.7(–1) cm diam., to ca 1 cm diam. when fresh, rather densely puberulous, without lateral bracts, color at maturity unknown, apex convex, ostiole 2–3 mm diam., almost flat to umbonate, the upper ostiolar bracts appressed-puberulous; internal hairs sparse, long, whitish. *Tepals* dark red, glabrous. *Stamens* 2. *Style* of long-styled flowers hairy.

Distribution.— S China, Vietnam, Cambodia, Thailand.

Ecology.— In evergreen forest, at altitudes to 1750 m.

Note.— This species shows strong similarities to *Ficus oreophilla* Ridl. (1920), a submontane species known by two collections from Peninsular Thailand. It differs, for example, in the shorter lateral veins and the usually smooth upper surface of the lamina.

8. Ficus geniculata (subg. *Urostigma*)

This species, is rather common in Thailand, but often difficult to distinguish from *F. virens* Ait. from which it differs in the petiole which is mostly 4–9 cm long (usually not longer than 4.5 cm in *F. virens*), the tertiary venation tending to run parallel to the lateral veins (rather than clearly reticulate), the base of lamina which is often subattenuate, the more pronounced articulation between lamina and petiole, due to which these parts are (more) frequently detached in dry material, and the smaller figs, ca 0.5 cm diam., with the upper ostiolar bracts glabrous. A thorough analysis of the variation of *F. virens* throughout its distributional range may help to make the differences between these two species clearer.

Ficus geniculata Kurz, J. Asiat. Soc. Bengal 42(2): 105. 1873; Kurz, Forest Fl. Burma 2: 447. 1877; King, Ann. Roy. Bot. Gard. (Calcutta) 1(1): 64, t. 80 and 84, X2. Type: Burma, Pegu, *Kurz* 1537 (holotype **K**).

Tree to 30(–40) m tall, hemi-epiphytic or (secondarily?) terrestrial, deciduous(?). *Branches* drying yellowish to brown. *Leafy twigs* 2–4 mm thick, ± angular, densely to sparsely brownish to whitish puberulous to subtomentellous (sometimes only on the nodes). *Leaves* spirally arranged; lamina ovate to elliptic to oblong, (7–)10–20 by (4.5–)6–11 cm, (sub)coriaceous, apex acuminate, base rounded (and the very base often subattenuate) to subcordate or to cuneate; both surfaces glabrous; cystoliths absent (?); lateral veins 8–14 pairs, the basal lateral to 1/10–1/5(–1/4) the length of the lamina, branched or un branched, tertiary venation reticulate to partly parallel to the lateral veins; waxy gland at the base of the midrib; petiole (2.5–)4–9(–15) cm long, ca 2 mm thick, glabrous, epidermis persistent or flaking at the apex; stipules 0.7–0.9 (on opening shoots to 3.5 cm or more?) cm long, ± densely brownish to whitish puberulous to subtomentose, caducous. *Figs* axillary, just below the leaves, or (ramiflorous) on older wood on to 1 cm long spurs, in pairs, solitary, or (on older wood) to 3 together), sessile or to 0.1 cm long pedunculate; basal bracts 3, ca 2 mm long, minutely puberulous outside, persistent (or caducous?); receptacle subglobose, 0.4–0.6 cm diam. when dry and the surface mostly wrinkled, glabrous or densely white tomentose, at maturity turning from white to pink to purple to black, apex convex to flat, ostiole 1–2

mm diam., flat to ± prominent, the upper ostiolar bracts glabrous puberulous); internal hairs present, white, chaffy. *Staminate flowers* ostiolar. *Tepals* reddish. *Ovary* red-brown.

Note.— Differences in indumentum, in particular on the fig receptacle, allows distinction of two varieties.

a. var. **geniculata**— *Ficus geniculata* var. *abnormalis* Kurz, Forest Fl. Burma 2: 447. 1877.

Fig receptacle (sub)glabrous.

Distribution.— India (NE and Peninsular, Andaman Islands), Bangladesh (?), Sikkim, Burma, S China, Laos, Vietnam, Cambodia, Thailand.

Ecology.— In deciduous and evergreen forest, (often?) on limestone, at low altitudes.

b. var. **insignis** (Kurz) C.C.Berg, **stat. et comb. nov.—** *Ficus insignis* Kurz, J. Asiat. Soc. Bengal 42(2) 105. 1873; Kurz, For. Fl. Burma 2: 447. 1877. Type: Burma, Pegu, *Kurz* 3151 (holotype **K**). *F. avium* Gagnep., Notul. Syst. (Paris) 4: 85. 1927. Type: Vietnam, near Nhatrang, *Poilane* 4559 (holotype **P**).

Fig receptacle densely white tomentose.

Distribution.— Burma, Vietnam, Cambodia, Thailand.

Ecology.— In the same habitats as the typical variety (?).

Notes.— Variation in presence and denseness of the indumentum on various parts, as on the receptacle, is also found in other species of subsect. *Urostigma*.

Corner (1965: 8) included *Ficus avium* Gagnep. and *F. insignis* in the synonymy of *Ficus lacor* Buch.-Ham. The type of *F. lacor*, Herb. F. (Buchanan) Hamilton no. 2406 (E), consists of two elements: **a.** part of a minutely puberulous leafy twig, leaf blades and petioles, belonging to *Ficus virens* Ait. (see also King, Ann. Roy. Bot. Gard. (Calcutta) 1(1): 62. 1887) and **b.** part of densely white tomentose leafy twig with densely white tomentose figs, matching the description of these parts for *F. insignis*. The former element is here designated as the lectotype.

9. Ficus glaberrima (subg. *Urostigma*)

This widespread species is represented by distinct subspecies of (exposed) limestone habitats in Thailand and at least also in Nepal, described as a varieties of both *F. glaberrima* and *F. arnottiana* (Corner, 1960).

Ficus glaberrima Blume, Bijdr.: 451. 1825; C.C.Berg & Corner, Fl. Males. 17(2): 655. 2005.— *Urostigma glaberrimum* (Blume) Miq., Fl. Ned. Ind. 1(2): 340. 1859.— Type: Indonesia, Java, G. Salak, *Reinwardt s.n.* (holotype **L**).

Tree to 20(–30) m tall or shrub, hemi-epiphytic or (secondarily?) terrestrial. *Branches* drying brown to grayish or blackish (with conspicuous lenticels). *Leafy twigs* 2–5 mm thick, ± angular, glabrous or sparsely minutely whitish puberulous; periderm persistent (or

flaking off). *Leaves* spirally arranged; lamina oblong or elliptic to broadly ovate, 6–15(–21) by 2.5–7.5(–8.5) cm, coriaceous, apex acuminate to subacute (to sucaudate), base cuneate to rounded or to cordate; both surfaces glabrous; midrib slightly prominent to flat above, lateral veins 6–9(–10), the basal pair distinct, to 1/10–1/6 the length of the lamina, unbranched or branched, tertiary venation reticulate; waxy gland at the base of the midrib; petiole 1–5 cm long, 1–2 mm thick, glabrous, drying brown to blackish; stipules (0.5–)1–1.5(–1.7) cm long, (sub)glabrous, caducous. *Figs* axillary, paired (or solitary); peduncle 0.3–3 cm long; basal bracts 1–2 mm long, (usually early) caducous; receptacle subglobose, 0.5–0.7 cm in diameter when dry, glabrous, yellow-orange to purple-black at maturity, apex convex, ostiole 2–2.5 mm in diameter, slightly prominent to flat, the 3 upper ostiolar bracts fully imbricate; wall smooth when dry; internal hairs absent. *Tepals* red(dish). *Ovary* partly red.

a. subsp. **glaberrima.**— *Ficus fraterna* Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 217, 287. 1867.— *F. thomsonii* Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 215, 286. 1867; Kurz, Forest Fl. Burma 2: 443. 1877.— *F. suberosa* H. Lév. & Vaniot, Repert. Spec. Nov. Regni Veg. 8: 549. 1910.— *F. feddei* H. Lév. & Vaniot, Repert. Spec. Nov. Regni Veg. 9: 19. 1911.

Tree to 20(–30) m tall. *Lamina* oblong, 6–15(–21) by 2.5–5.5(–8.5) cm, apex acuminate to subacute (to subcaudate), base cuneate to rounded; basal lateral veins unbranched; petiole 1–3(–5) cm long; stipules 1–1.5(–1.7) cm long. *Fig* peduncle 0.3–1.2 cm long; basal bracts early caducous.

Distribution.— Nepal, Sikkim, Bhutan, India (NE and Andaman Islands), Burma, S China, Vietnam, Laos, Indonesia (Sumatra: northern, Java, Lesser Sunda Islands: Sumbawa).

Ecology.— In evergreen and (mixed) deciduous forest, at altitudes to 1600 m.

b. subsp. **siamensis** (Corner) C.C.Berg, **stat. et comb. nov.—** *F. glaberrima* Blume var. *siamensis* Corner, Gard. Bull. Singapore 17: 388. 1960. Type: Thailand, Saraburi, Hin Hap, *Kerr* 2428 (holotype **BM**, not found; isotype **K**).— *F. arnottiana* Miq. var. *subcostata* Corner, Gard. Bull. Singapore 17: 379. 1960. Type: Nepal, Melcham, 7500 ft, *Polunin, Sykes & Williams* 4145 (holotype **BM**; isotype **E**).

Shrub or tree to 7 m tall. *Lamina* broadly ovate to elliptic, 6–10 by 4–7.5 cm, apex short-(sub)acuminate, base cordate to rounded (or to obtuse); basal lateral veins mostly branched; petiole 2–5 cm long; stipules 0.5–1.3 cm long. *Fig* peduncle 0.3–3.3 cm long; basal bracts usually early caducous.

Distribution.— Nepal, NE India (?), Burma (?), Thailand.

Ecology.— On (more or less exposed) limestone rocks, at altitudes to ca 2500 m (in Nepal).

10. Ficus griffithii (subg. *Sycomorus*)

This highly peculiar species is only known by the type from Burma and three additional collections from Thailand (Kanchanaburi, Saraburi). This suggests that the range of distribution is very small, and the habitat unusual (or destroyed in Thailand). One of the labels describes the species as a ground-covering herb (!). It was initially included in *Ficus heterophylla* (King, 1888), a member of subg. *Sycidium* (sect. *Sycidium*). Corner (1965)

established subsect. *Lepidotus* (of sect. *Sycocarpus*) to accommodate this species in his classification of the genus. The species can be included in subsect. *Sycocarpus* as defined by Berg (2004).

Ficus griffithii (Miq.) Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 297. 1867; Corner, Gard. Bull. Singapore 18: 39. 1960— *Covellia griffithii* Miq., London J. Bot. 7: 467. 1848. Fig. 4.

Shrub or subshrub with trailing stems and erect leafy twigs. *Leafy twigs* 1.5–2.5 mm thick, minutely white puberulous and strigillose, with nodal waxy glands present (? faint); internodes hollow; periderm persistent. Leaves in lax spirals to subdistichous; lamina elliptic to ovate, 4–15 by 2.5–8 cm, symmetric, chartaceous to membranaceous, apex acute to subacuminate, base cordate to rounded, margin (coarsely) crenate to dentate; upper surface sparsely puberulous to strigillose on the maine veins, scabridulous, lower surface sparsely strigillose on the main veins, smooth, cystoliths only beneath (or also sparsely above?); lateral veins 4–6, branched or forked away from the margin, basal pair to 1/3–1/2 the length of the lamina, tertiary venation loosely scalariform to subreticulate; waxy glands in the axils of some of the lateral veins in the middle of the lamina; petioles unequal in length on the same twig, 1–5 cm long, ca 1 mm thick, white (sub)strigillose, epidermis persistent; stipules 0.5–1 cm long, (sub)glabrous, subpersistent. *Figs* axillary; peduncle 0.5–0.8 cm long; bracts 3, verticillate, ca 1.5 mm long; receptacle subglobose, when dry 1–1.5 cm diam. to 0.4 cm long stipitate, puberulous, with lateral bracts, colour at maturity unknown, apex convex, ostiole ca 3 mm diam., surrounded apical bracts; internal hairs absent. *Stamen* 1. *Styles* of the long-styled flower hairy. *Fruit* not seen.

Distribution.— Burma, Thailand

Ecology.— In evergreen forest, at low altitudes.

Note.— This a peculiar suffrutescent species with procumbent, trailing stems, shows in its habit similarities to *Ficus assamica*, *F. heterophylla*, and *F. montana*.

11. Ficus heterostyla (subg. *Sycomorus*)

Corner (1960) describe two varieties in *Ficus hispida* L.f.: var. *badiostrigosa* and var. *rubra*. The differences of the material included in these varieties are sufficient to reinstate *Ficus heterostyla* Merr., which was reduced to a synonym of the former. This species differs from *F. hispida* in bearing the figs only (or predominantly?) on long rooting branched departing from the base of the trunk, in lacking lateral bracts, and turning to brown, red, or orange at maturity. Moreover, the indumentum is usually (dark) brown, however, it is whitish in the type of var. *rubra*. The indumentum is mostly whitish in *F. hispida*. However, brown or brownish (patent or appressed) indumentum is found in collections from Sri Lanka, S. India, Burma, and S. China and that indumentum is apparently associated with stoloniflory. This form of *F. hispida* differs from *F. heterostyla* in the (usually) obovoid to pyriform receptacle with lateral bracts and ripening yellowish and in the peduncles longer than 0.3 cm. The figs may also be borne on the trunk on short branchets and stolon-like branches without figs. The pyriform figs with lateral bracts are borne on the trunk and main branches. This decision to reinstate *F. heterostyla* is to be published in a separate paper dealing with several stoloniflorous species (Berg & Chantarasuwan, in press).

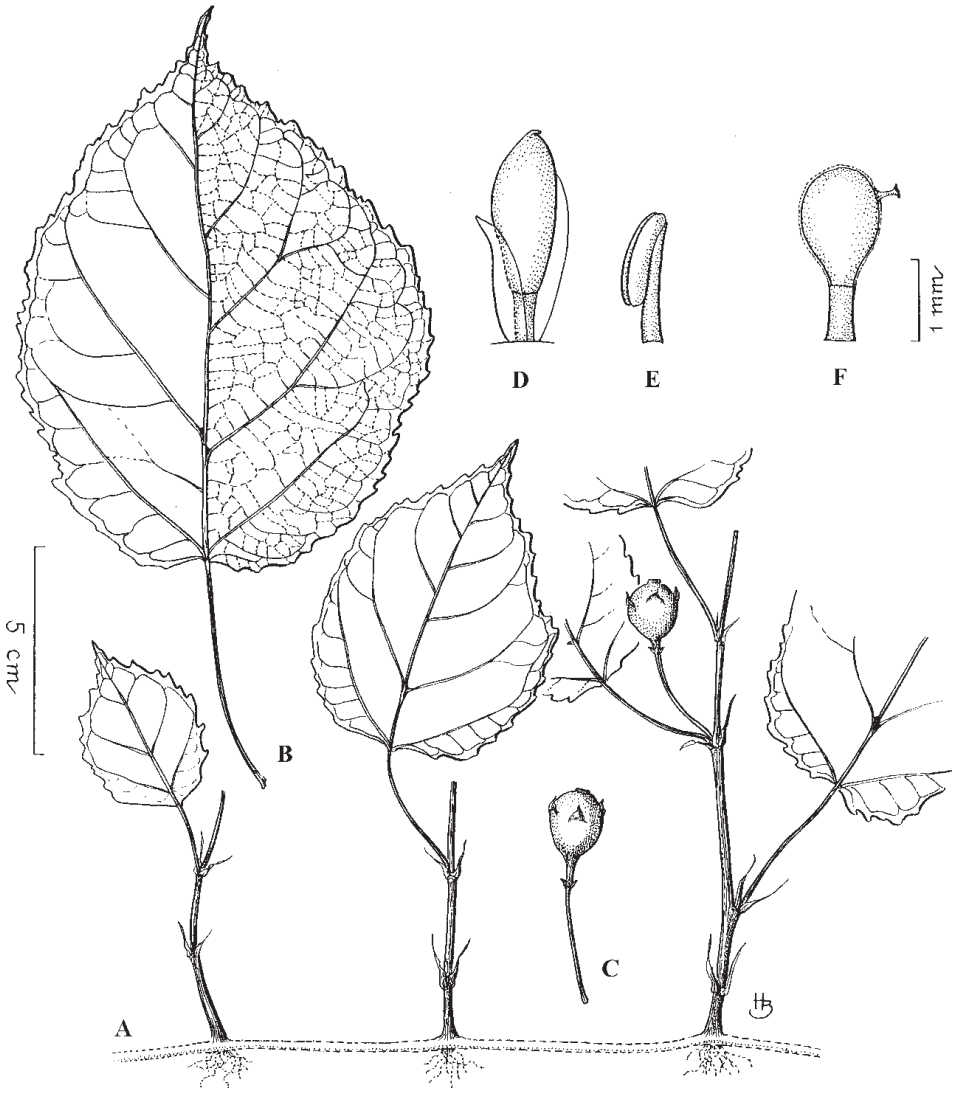

Figure 4. *Ficus griffithii* (Miq.) Miq. A. creeping branch with fig-bearing leafy twigs; B. leaf; C. fig; D. staminate flower with bracteoles; E. stamen; F. short-styled pistillate flower. All from *Kostermans* et al. 894 (L). Drawn by Hendrieke Berg.

12. Ficus hirta (subg. *Ficus*)

Ficus hirta Vahl (1805) as defined by Corner (1960, 1965) and in that composition adopted by Berg (2003) proved to be too heterogeneous to be maintained as such. It consists of the following species: *F. hirta* Vahl, widespread), *F. ochracea* (C.C Berg) C.C.Berg (Sumatra), *F. triloba* Voigt (to replace subsp. *roxburghii* (Miq.) C.C.Berg (2003), widespread and with two subspecies); the descriptions of the two segregate species are presented below. *Ficus hirta* var. *adpressus* Corner (1960) does indeed belong to *F. hirta;* however, *Ficus hirta* var. *brevipila* is transferred to *F. cambodica* (see above).

13. Ficus malayana (sub. *Sycomorus*)

This species occurring in Thailand, Peninsular Malaysia, Sumatra, and Borneo will replace *Ficus uncinata* Becc. var. *strigosa* as part of revision of *F. uncinata* sensu Corner (1960, 1962, 1965) which contained elements of three distinct species. This revision is to be published in a separate paper dealing with several stoloniflorous species (Berg & Chantarasuwan, in press).

14. Ficus ochracea (subg. *Ficus*)

Ficus ochracea (C.C.Berg) C.C.Berg, **stat. nov.**— *F. hirta* Vahl subsp. *ochracea* C.C.Berg, Blumea 48 (2003) 537.— Type: Indonesia, Sumatra. Atjeh, Gunung Leuser Nature Reserve, *de Wilde & de Wilde-Duyfjes* 13774 (holotype **BO**; isotype **L**).

Treelet to 6 m tall. *Leafy twigs* 2–4 mm thick, brown hirtellous; internodes solid; waxy glands at the base of the petiole lacking; periderm persistent. *Leaves* in spirals (to subdistichous); lamina elliptic to oblong to (sub)obovate), (6–)12–25 by (2.5–)6–11.5 cm, chartaceous, apex shortly (sub)acuminate, base rounded (to subcordate), margin dent(icul)ate; upper surface puberulous to strigillose, ± scabrous, lower surface densely brownish to yellowish puberulous to hirtellous, scabridulous to smooth; cystoliths absent; lateral veins (4–)6–8 pairs, the basal pair to 1/6–1/4 the length of the lamina, often branched, other lateral veins often branched or furcate far from the margin, tertiary venation scalariform, ± prominent beneath; waxy glands in the axils of the basal lateral veins; petiole (0.5–)1.5–5 cm long, 1–2 mm thick, brownish to yellowish puberulous hirtellous, the epidermis persistent; stipules 0.8–1.2 cm long, yellowish subsericeous, caducous. *Figs* axillary and below the leaves on previous season's growth, in pairs, sessile or with a peduncle to 0.3 cm long; basal bracts 3, 3–4 mm long, yellowsih appressed puberulous to stigillose, persistent; receptacle subglobose, 0.8–1.2 cm in diameter when dry, yellow subvelutinous, without lateral bracts, red at maturity, apex ± convex, ostiole c. 2 mm in diameter, flat; internal hairs abundant, whitish.

Distribution.— Indonesia (Sumatra: Atjeh).

Ecology.— In montane forest at altitudes between 800 and 1800 m.

15. Ficus ribes (subg. *Sycomorus*)

The position of the cystoliths, on both surfaces of the lamina or only beneath, can be regarded as such a poor differentiating character that *Ficus ribes* Blume and *Ficus scortechenii* King, provisionally kept separate in Flora Malesiana (Berg & Corner, 2005) are united. As a consequence, *Ficus arafakensis* King from New Guinea has to be included, thus creating a disjunct species distribution. The revised description is to be presented in a separate paper dealing with several stoloniflorous species (Berg & Chantarasuwan, in press).

16. Ficus ridleyana (subg. *Sycomorus*)

This species is closely related to *Ficus vrieseana* (including the type of *Ficus chamaecarpa*) from Sumatra and Java from which it differs in the shorter stipules, 0.5–1.5 cm on the leafy twigs and ca 0.5 cm long on the stolons (versus 1–2.5 cm and ca 1 cm long respectively in *F. vrieseana*), the shorter (ca 2 mm long) and appressed basal bracts (versus 2–3 mm long and patent basal bracts), the more pronouncedly asymmetric lamina; probably also in the absence of nodal glands and in the persistence of hairs on the fig receptacle. The fig receptacle and flowers are depicted in Corner (1933) Figs. 10 and 11. *Ficus ridleyana* can be distinguised from the sympatric *Ficus malayana* in the indumentum on the vegetative parts consisting of hairs of different length and the long hairs mostly dark brown to almost blackish and the absence of lateral bracts.This species, known by a single collection from Thailand, will be published in a separate paper dealing with several stoloniflorous species (Berg & Chantarasuwan, in press).

17. Ficus saxophila (subg. *Urostigma*)

The material described as *Ficus cardiophylla* by Merrill (1926) and as *Ficus bonii* by Gagnepain (1927) differs from material included in *Ficus saxophila* Blume (1825–1826) in the smaller fig receptacles with smaller basal bracts 0.4–0.6 cm diam. with 1–3 mm long basal bracts versus 0.5–0.8 cm diam. with 3–4.5 cm long basal bracts. The smaller size of the figs may be linked to smaller size of the plants, often shrub-like and the smaller size of the leaves, usually less than 10 cm long. Collections with smaller dimensions of various parts are found from China (Guangxi) through Vietnam to Thailand. *F. saxophila* is found in Christmas Island, Java, Lesser Sunda Islands (Timor), New Guinea, Philippines, and Sulawesi. However, within the range of the form with small parts, collections with larger figs also occur, e.g., *Pierre* 4695 (P) and *Poilane* 1990 (L, P) from Vietnam; they appear to differ from the Malesian specimens in the petiole that becomes (consistently?) longer than in the Malesian collections, even to 11 cm long. Disjunct occurrence and size differences allow distinction of the two entities as subspecies: the typical one comprising Malesian material and subsp. *cardiophylla*, comprising most of the Asian mainland material. It is not yet clear whether the collections with large leaves from Vietnam should just be included in the typical subspecies or whether the establishment of a third subspecies is the right decision.

Ficus saxophila Blume subsp. **cardiophylla** (Merr.) C.C.Berg, **stat. et comb. nov.**— *F. cardiophylla* Merr., Univ. Calif. Publ. Bot. 13: 129. 1926; Corner, Gard. Bull. Singapore 21: 7. 1965. Type: Vietnam, Cho Ganh, *Petelot 1291* (holotype **A**).— *F. bonii* Gagnep., Notul. Syst. (Paris) 4: 86. 1927; Gagnep., Fl. Indo-Chine 5: 767. 1928. Type: Vietnam, Lang-hê, Ninh-binh region, *Bon* 4045 (holotype **P**).

Shrub, sometimes scandent, or tree to 6 m tall, hemi-epilithic (or hemi-epiphytic), secondarily terrestrial. *Branches* drying red-brown to blackish. *Leafy twigs* 1–3 mm thick, slightly angular to subterete, white puberulous. *Leaves* spirally arranged; lamina ovate to subovate (to elliptic to oblong), 2.5–12 by 2–7.5 cm, (sub)coriaceous, apex acuminate, the acumen acute, base cordate to cordulate to rounded; upper and lower surface glabrous; cystoliths only beneath; lateral veins 3–6 pairs, the basal pair to 1/4–1/2 the length of the lamina, branched, tertiary venation reticulate; waxy gland at the base of the midrib; petiole 1.5–4.5 cm long, ca 1 mm thick, glabrous or sparsely minutely white puberulous, mainly at the base; stipules 0.3–1(–1.5) cm long, ± densely white puberulous, caducous. *Figs* axillary or just below the leaves, in pairs (or solitary), sessile; basal bracts 3, 2–3 mm long, white puberulous and/or ciliolate, persistent; receptacle subglobose, 0.4–0.6 cm diam. when dry, glabrous or minutely white puberulous, red at maturity, apex convex to flat, ostiole 1–1.5 mm diam., prominent, the upper ostiolar bracts (minutely white puberulous and/or) ciliolate; internal hairs absent. *Staminate flowers* near the ostiole. *Tepals* dark red. *Ovary* dark red-brown.

Distribution.— China (Guangxi), Vietnam, Thailand.

Ecology.— In deciduous forest or scrub, in coastal vegetation, often on (limestone) rocks, at low altitudes.

Notes.— A collection from Peninsular Malaysia (Langkawi), included in the species in Flora Malesiana 17(2): 611. 2005, proved not to belong to this species, but to a related one, which is still unnamed.

The type of *Ficus glabella* Blume var. *tonkinensis* Drake, with doubt included in the synonymy of *F. cardiophylla* by Corner (1965), has not been examined.

18. Ficus subpisocarpa (subg. *Urostigma*)

Ficus subpisocarpa Gagnep. (1927), was reduced to a synonym of *Ficus superba* (Miq.) Miq. var. *japonica* Miq (1866–1867) by Corner (1965), but in Flora Malesiana (Berg & Corner, 2005) reinstated as species.

Ficus subpisocarpa Gagnep., Notul. Syst. (Paris) 4: 95. 1927; Gagnep., Fl. Indo-Chine 5: 769. 1928; C.C.Berg & Corner, F. Mal. 17(2). 611. 2005.— Type: Vietnam, near Haiphong, Balansa 759 (lectotype **P**, designated here).

Tree, to 7 m tall or shrub, hemi-epilithic or terrestrial, deciduous (?). *Branches* drying (red-)brown to dark grey. *Leafy twigs* (1.5–)3–7 mm thick, subterete, subglabrous or more or less densely whitish puberulous. *Leaves* spirally arranged; lamina oblong to elliptic to (sub)ovate, (4–)6–16(–24) by (1.5–)3–9(–13) cm, (sub)coriaceous, apex (short-)acuminate,

the acumen mostly blunt, base truncate to obtuse (to cuneate); both surfaces glabrous; cystoliths only beneath; lateral veins 7–10(–11) pairs, often forked away from the margin, the basal pair to ca 1/10–1/4 the length of the lamina, unbranched, tertiary venation reticulate to partly parallel to the lateral veins; waxy gland at the base of the midrib, in dry material often in a groove at the base of the midrib; petiole (1.5–)2.5–5(–9) cm long, minutely puberulous at the base (or the whole petiole puberulous) or glabrous and then the epidermis often flaking off at the base of the petiole, if puberulous, then usually persistent; stipules 0.3–0.7 (on opening shoots to 5 cm long) cm long, densely (to sparsely) whitish puberulous to subtomentose, caducous or subpersistent and (usually) forming a ovoid (to subglobose) terminal bud. *Figs* ramiflorous on to 0.5 cm long curved spurs, 1–3 together; peduncle 0.3–0.7(–0.9) cm long, rather sparsely minutely whitish puberulous or glabrous; basal bracts 3, 3–5 mm long, (sub)glabrous, caducous; receptacle subglobose to subpyriform, 0.5–0.8 cm diam. when dry and the surface wrinkled, (sub)glabrous, turning from white to pink to purple to black at maturity, apex convex to flat, ostiole 2–3 mm diam., ± prominent to flat, the upper ostiolar bracts glabrous; internal hairs absent. *Staminate flowers* near the ostiole. *Tepals* reddish. *Ovary* red-brown.

Note.— Two subspecies can be recognized on the basis of features of the base of the petiole, of which the typical one is rare and the new one common in Thailand.

a. subsp. **subpisocarpa**— *Ficus superba* (Miq.) Miq. var. *japonica* Miq., Prolus. Fl. Jap.: 132. 1866/67.— Type: Japan, Distr. Kowara, *Siebold s.n.* (**L**), see Bull. Tokyo Univ. Museum 41: 40. 2005.

Leafy twigs (sub)glabrous; petiole glabrous, its epidermis flaking off at the base; stipules sparsely (to densely) whitish puberulous.

Distribution.— Southern Japan, eastern continental China, Taiwan, Vietnam, Cambodia (?), Thailand, Indonesia (Moluccas: Ceram).

Ecology.— In evergreen and deciduous forest, at low altitudes.

b. subsp. **pubipoda** C.C.Berg, **subsp. nov.** A subspecie typica petioli basis epidermide pubescent bon-exfoliati differt. Typus. Thailand, Chaiyaphum, Thungkamang, *van Beusekom* et al. 4218 (holotype **BKF**; isotypes **K**, **L**, **P**).

Leafy twigs ± densely whitish puberulous; petiole minutely whitish puberulous at the base (or the whole petiole puberulous), the epidermis (usually) persistent; stipules ± densely puberulous.

Distribution.— Vietnam, Cambodia, Thailand, Peninsular Malaysia (Kedah, Perak, Perlis).

Ecology.— In deciduous or evergreen forest, at altitudes to 1400 m.

19. F. talbotii (subg. *Urostigma*)

Corner (1960) described *Ficus calcicola* and placed it in his checklist (1965) near *F. talbotii* King (described from Peninsular India) in which he included *F. pierrei* Gagnep. (from Cambodia). These names proved to be based on material of a single species.

Ficus talbotii King, Ann. Roy. Bot. Gard. (Calcutta) 1(1): 51, t. 63. 1887; Talbot, For. Fl. Bombay 2: 511, t. 521. 1911; Corner, Gard. Bull. Singapore 21: 19 1965; Corner, Rev. Handbook Fl. Ceyl. 1(2): 139, t. 14. 1977. Type: India, N. Kanara District, 28 Nov. 1884, *Talbot* 1100 (lectotype **CAL**, designated here); remaining former syntype: India, Kanara, *Talbot* 655 (**BSI**, **CAL**).— *F. pierrei* Gagnep., Notul. Syst. (Paris) 4: 93. 1927; Gagnep., Fl. Indo-Chine 5: 763. 1928. Type: Cambodia, Samrong-tong, Chéreer, *Pierre* 1676 (holotype **P**).— *F. calcicola* Corner, Gard. Bull. Singapore 17: 392. 1960; Kochummen, Tree Fl. Malaya 3: 142. 1978; C.C.Berg & Corner, Fl. Males. 17(2): 636. 2005. Type: Malaysia, Selangor, Kauching, Bukit Takun, *Mohammed Nur in SFN* 34388 (holotype **SING**).

Tree to 22 m tall or shrub, mostly hemi-epilithic, sometimes hemi-epiphytic, deciduous. *Branches* drying brown to blackish. *Leafy twigs* 2–3 mm thick, slightly angular to subterete, brown subtomentose, brown floccose-tomentellous, (minutely) whitish puberulous, or subglabrous; periderm flaking off. *Leaves* spirally arranged to subdistichous; lamina oblong to elliptic, 2–10(–15) by (0.5–)2–5(–8) cm, (sub)coriaceous, apex acuminate, base rounded to obtuse, margin flat to slightly revolute; upper surface glabrous or puberulous (or also floccose tomentellous) on the midrib, lower surface sparsely brown puberulous to subtomentose on the midrib or also the lateral vein (brown floccose tomentellous or glabrous); midrib prominent, lateral veins (3–)5–8(–11) pairs, the basal pair ± to hardly distinct, to 1/5–1/3 the length of the lamina, (faintly) branched or unbranched, tertiary venation reticulate (in large leaves to subscalariform), slightly prominent, 0–1 pairs of smaller lateral veins below the main pairs; waxy gland at the base of the midrib; petiole 0.5–1.5(–2.2) cm long, 1–2 mm thick, brown puberulous to subtomentose (or brown floccose tomentellous), drying blackish; stipules 0.3–1 cm long, brown subtomentose to (sparsely) puberulous (to only ciliolate), caducous. *Figs* axillary or just below the leaves, solitary or paired, sessile (or with a peduncle to 0.2 cm long); basal bracts 3, 1–2 mm long, subequal, puberulous, persistent; receptacle subglobose (to obovoid), 0.5–0.8 cm diam. when dry, glabrous or minutely white puberulous (or densely brown floccose tomentellous) , purple at maturity, apex convex to flat, ostiole 1.5–2 mm diam., prominent, closed, the upper ostiolar bracts fully imbricate; wall smooth when dry; internal hairs absent or present, few. *Tepals* (dark) red. *Ovary* partly red.

Distribution.— Sri Lanka, India, Burma, S China (Yunnan), Laos, Vietnam, Cambodia, Thailand, Peninsular Malaysia.

Ecology.— Mostly in deciduous forest, mostly on limestone, sometimes on granite or quartzite cliffs or boulders; at low altitudes to ca 1700 m.

Notes.— The description by King (1887) states that the plant is glabrous on all parts, but Talbot (1911) described the stipules as pubescent. The stipules are nearly always hairy, but are occasionally only ciliolate (only on opening shoots?).

In India, the petioles tend to be longer than elsewhere.

In Thailand, a form with the floccose tomentellous indumentum, almost similar to that found in *F. consociata*, is rather rare, represented by for example, *Pooma et al.* 3820 (from Lop Buri). The variation in indumentum is a matter which needs attention in future morphological and ecological studies on this species.

20. Ficus triloba (subg. *Ficus*)

Ficus triloba Buch.-Ham. ex Voigt, Hort. Sub. (Calcutta): 284. 1845, substitute name; Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 270, 290. 1867; Kurz, Forest Fl. Burma 2: 449. 1877.— *F. hirsuta* Roxb., Fl. Ind., ed. Carey 3: 528. 1832, non Schott, 1827; Wight, Ic. 2: t. 670. 1843. Type: Bangladesh, Sylhet, B. Dunguro, *Smith s.n.* (not yet traced).— *F. hirta* var. *triloba* (Buch.-Ham. ex Voigt) Kuntze, Revis. Gen. Pl. 1: 627. 1891.

Tree to 15 m tall or shrub. *Leafy twigs* 5–20 mm thick, rusty brown hirsute to setose, the hairs with thickened bases or to hirtellous, the longer hairs intermixed with sparse to dense much shorter brownish hairs, conspicuous to inconspicuous pairs of waxy glands at the bases of the petioles; internodes often hollow; periderm persistent. *Leaves* in spirals; lamina cordiform to ovate or to suborbicular and often subpalmately 3–5-7-lobed to -fid, or elliptic to oblong and not constricted in the lower part, (5-)10–32(–42) by (3.5-)10–25(–40) cm, chartaceous, apex shortly (sub)acuminate, base cordate, margin denticulate; upper surface brown hirtellous, mainly on the veins, smooth to scabridulous, lower surface densely white-tomentose to -subvillous covering the areoles, on the reticulum and/or smaller veins white-tomentose to -puberulous, and on the main veins brown to whitish hirtellous to subhirsute, smooth; cystoliths absent; lateral veins 4–5(–6) pairs, the basal pair branched, to 1/2–2/3 the length of the lamina, branched, other lateral veins often branched or furcate far from the margin, tertiary venation scalariform, ± prominent beneath; waxy glands in the axils of the (main) basal lateral veins, smaller ones in axils of other lateral veins and in furcations of lateral veins; petiole (2–)5–15 cm long, 2–3(-4) mm thick, hirsute and mintely whitish puberulous, the epidermis persistent; stipules (1–)1.5–5 cm long, whitish appressed-puberulous to -sericeous and/(or only) on and along the keel and the base brown strigose, caducous or subpersistent. *Figs* axillary, in pairs or solitary, (sub)sessile; basal bracts 3, 1–1.5 cm or 0.5–2.5 cm long, persistent (or if long then caducous), white appressed-puberulous to -subsericeous and brown strigose on the keel; receptacle ellipsoid to ovoid to subglobose (or to subcylindrical), when dry (0.7-)1.2–2.5(–3.5) cm diam., rusty brown-hirsute to -strigose or to -hirtellous, sometimes with to 1.5 cm long lateral bracts, at maturity yellow to red, apex convex, ostiole 5–7 mm diam., surrounded by a roset of to 0.6 mm long ostiolar bracts pointing upwards or by stiff brown hairs; internal hairs abundant, white. *Styles* (of long-styled flowers) hairy.

a. subsp. **triloba**— *Ficus hirta* Roxb., Fl. Ind., ed. Carey 3: 531. 1832, non Vahl, 1805; Wight, Ic. 2: t. 672. 1843.— *F. roxburghii* Miq., London J. Bot. 7: 456. 1848, non Wall., 1840.— *F. hirta* var. *roxburgii* King, Sp. Ficus 2: 150, t. 189. 1888; Gagnep. in Fl. Indo-Chine 5: 804. 1928.— *F. hirta* subsp. *roxburghii* (King) C.C.Berg, Blumea 48: 537. 2003 and 49: 154. 2004; C.C.Berg & Corner, Fl. Males.17(2): 115. 2005.— *F. cordata* Ridl., J. Straits Branch Roy. Asiat. Soc. 57: 93. 1911, non Kunth. & C.D. Bouché, 1847, nec Thunb., 1786; Ridl., Fl. Malay Penins. 3: 347 1924; Corner, Gard. Bull. Singapore 10: 285. 1939; Corner, Wayside Trees: 282, f. 251. 1940, as *F. hirta* Vahl.— *F. esquiroliana* H. Lév., Bull. Geogr. Bot. 24: 252. 1914.— *F. hirta* Vahl var. *malayana* Corner, Gard. Bull. Singapore 17: 430 1960.— *F. hirta* Vahl var. *squamosa* Corner, Gard. Bull. Singapore 17: 431 1960.

Stipules white appressed puberulous to subsericeous and brown strigose on the and along the midrib and on the base, mostly caducous.

Distribution.— Sikkim, NE India, Bangladesh, S China, Burma, Thailand, Vietnam, Laos, Thailand, Peninsular Malaysia, Indonesia (Sumatra).

Note.— *Ficus triloba* was meant to be a substitute name for both *F. hirsuta* Roxb. and *F. hirta* Roxb..

b. subsp. **quangtriensis** (Gagnep.) C.C.Berg, **stat. et comb. nov.**— *Ficus quangtriensis* Gagnep., Notul. Syst. (Paris) 4: 94. 1927; Gagnep., Fl. Indo-Chine 5: 805, t. 92. 1928. Type: Vietnam, Prov. Quang Tri, Lang Khaoi, *Poilane* 10729 (lectotype **P**, designated here).

Stipules brownish strigose on the keel, subpersistent.

Distribution.— Vietnam.

Ecology.— In forest in rocky or sandy areas, at altitudes between 500 and 1000 m.

Note.— Other collections examained and included are: *Poilane* 11243, 13184, 31640 (P).

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REFERENCES

Berg, C.C. (2003). Flora Malesiana precursor for the treatment of Moraceae 3: *Ficus* subgenus *Ficus*. Blumea 48: 529–550.

_____. (2004). Flora Malesiana precursor for the treatment of Moraceae 6: *Ficus* subgenus *Sycomorus*. Blumea 49: 155–207.

Berg, C.C. & B. Chantarasuwan. (In press). A study on the taxonomy of some stoloniflorous species of *Ficus* subsect. *Sycocarpus* (Moraceae) in Thailand and Malesia. Blumea 52: 000–000.

Berg C.C. & E.J.H. Corner. (2005). Moraceae (*Ficus*). In: Nooteboom, H.P. (ed.), Flora Malesiana 17(2): 1–730. Leiden

Blume, C.L. (1825–1826). Bijdragen tot de flora van Nederlandsch Indië. Batavia.

Corner E.J.H. (1960). Taxonomic notes on *Ficus* Linn., Asia and Australasia. I. Subg. *Urostigma* (Gasp.) Miq. The Gardens Bulletin: Singapore 17: 368–404.

Corner E.J.H. (1960). Taxonomic notes on *Ficus* Linn., Asia and Australasia. III. Subg. *Ficus* sect. *Ficus*. The Gardens Bulletin: Singapore 17: 416–441.

Corner E.J.H. (1960). Taxonomic notes on *Ficus* Linn., Asia and Australasia. IV. Subg. *Ficus* sect. *Sycidium* Miq. The Gardens Bulletin: Singapore 17: 442–485.

Corner E.J.H. (1960). Taxonomic notes on Ficus Linn., Asia and Australasia. V. Subg. *Ficus* sect *Rhizocladus*, *Kalosyce*, *Sinosycidium*, *Adenosperma*, and *Neomorphe*. The Gardens Bulletin: Singapore 18: 1–35.

Corner E.J.H. (1965). Check-list of *Ficus* in Asia and Australasia with keys to identification. The Gardens Bulletin: Singapore 21: 1–186.

Gagnepain, F. (1927). Espèces nouvelles de *Ficus*. Notulae Systematicae, Herbier du Muséum de Paris. Phanerogamie. Paris. 4: 84–98.

Gagnepain, F. (1928–1929). *Ficus*. In: M.H. Lecomte (ed.), Flore Generale de l'Indochine 5: 740–828. Masson et Cie, Paris.

King G. (1887). The species of *Ficus* of the Indo-Malayan and Chinese countries. Annals of the Royal Botanic Garden (Calcutta) 1(1): 1–66, t. 1–87.

Léveillé, H. & E. Vaniot. (1907). Los *Ficus* de Chine. Memorias de la Real Academia de Ciencias y Artes de Barcelona, Ser. 3, 6: 147–153.

Loureiro, J. de. (1790). Flora Cochinchinensis. Lisbon.

Merrill, E.D & W.Y. Chun. (1935). Additions to our knowledge of the Hainan flora II. Sunyatsenia 2: 203–332.

Miquel, F.A.W. (1866–1867). Prolusio florae japonicae. Amsterdam, Utrecht

Miquel, F.A.W. (1867). Annotationes de *Ficus* speciebus. Annales Musei Botanici Lugduno-Batavi 3: 260–300.

Vahl, M. (1805). Enumeratio plantarum 2. Copenhagen.