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RESEARCH ARTICLE

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Seven new Malesian species of *Ficus* (*Moraceae*)

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Key word

Borneo
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Abstract Descriptions of seven new species, *Ficus buntaensis*, *F. flavistipulata*, *F. jambiensis*, *F. porata*, *F. samarana*, *F. sorongensis* and *F. temburongensis* are presented and the related species briefly discussed.

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I. TWO NEW SPECIES FROM NEW GUINEA

Shortly after the publication of the treatment of *Ficus* in Flora Malesiana (Berg & Corner 2005) a new species of sect. *Adenosperma* (subg. *Sycomorus*) from New Guinea was discovered (Berg 2007a). Finding again two species of that section, here described, is an indication that more novelties belonging to this section are to be discovered in Papua Guinea.

Ficus porata C.C.Berg, *sp. nov.* — Fig. 1

Ficu casearioidi similis, laminarum apice acuminato, ficis sessilibus minutis ostiolo depresso distincta. — Typus: *M. Janda Y068* (holo LAE; iso L), Papua New Guinea, Sandaun Prov., Yapsiei, 112 m, 26 Mar. 2004.

Tree, small. *Leafy twigs* 1.5–3 mm thick, subterete, sparsely minutely white puberulous. *Leaves* spirally arranged; lamina coriaceous, oblong, 10–18 by 3.5–6 cm, slightly inequilateral, apex acuminate, base obtuse, margin entire, revolute towards the base; upper surface glabrous, lower surface glabrous, subtessellate; cystoliths only beneath, sparse; midrib (almost) plane above, lateral veins 6–8 pairs, none furcate away from the margin, the basal pair up to 1/6–1/3 the length of the lamina, tertiary venation reticulate; waxy glands present in the axils of the basal lateral veins; petiole 0.7–1.2 cm long, 1–2 mm thick, minutely white puberulous adaxially, the epidermis flaking off; stipules c. 0.5 mm long, sparsely white appressed-puberulous, caducous. *Figs* below the leaves, solitary or clustered, up to 4 together, subsessile. *Basal bracts* c. 1 mm long; receptacle depressed-globose, 0.5–0.6 cm diam, without lateral bracts, glabrous, punctate; ostiole sunken; internal hairs absent. *Staminate flowers* subsessile to shortly pedicellate, subtended by 2 lanceolate bracts; tepals 3, lanceolate; anthers 2, 0.8–1.2 mm long. *Short-styled flowers*: tepals 3, mostly (sub)spathulate.

Distribution — Only known from the type collection.

Habitat — Humid forest; at a low altitude.

Note — The species resembles *F. casearioides* King in the reticulate tertiary venation and the subtessellate lower surface of the lamina, but it clearly differs in the distinctly acuminate apex of the lamina, the more distinct basal lateral veins, up to 1/3 the length of the lamina, the shorter stipules, and more pronouncedly in the smaller and subsessile figs, with the ostiole sunken in pore in the apex of the fig receptacle.

Ficus sorongensis C.C.Berg, *sp. nov.* — Fig. 2

Ficu arbusculae similis, indumento conspicuo partibus juvenilibus, petioli epidermi persistenti, ficis (sub)sessilibus sine bracteis lateralibus, ostioli bracteis pubescentibus differt. — Typus: *Pleyte 517* (holo L), Indonesia, Papua, Sorong, Kadamak, 11 Aug. 1948.

Shrub or treelet up to 4 m tall, with apparent *Terminalia*-branching. *Leafy twigs* 2–3 mm thick, whitish subvillous to brownish puberulous to strigillose or to hirtellous, clearly so on nodes, glabrescent, internodes hollow; periderm persistent. *Leaves* spirally arranged, tufted at shoot apices; lamina coriaceous, oblong to sublanceolate, 3–9.5 by 1–3 cm, symmetrical, apex (sub)acuminate to acute, base rounded to cuneate, margin entire; upper surface sparsely yellowish hirtellous to strigillose to subvillous, mainly on the main veins, glabrescent, lower surface pale brown to yellowish puberulous to strigillose to subvillous, mainly on the main veins, glabrescent, the midrib and lateral veins sometimes with red-brown spots; cystoliths on both sides; lateral veins 6–10 pairs, the basal pair ± distinct, up to 1/10–1/6 the length of the lamina, branched, tertiary venation reticulate to subscalariform (with up to 6 rather distinct intercostals); waxy glands present in the axils of the basal lateral veins; petiole 0.5–2 cm long, c. 1.5 mm thick, yellowish to whitish puberulous to hirtellous to strigillose to subvillous, glabrescent, the epidermis persistent; stipules 0.7–1.3 cm long, whitish to brownish hirtellous to strigilose to subvillous, mainly on the keel, subpersistent at shoot apices. *Figs* axillary, solitary, (sub)sessile; basal bracts 3, ± subverticillate, 1.5–3 mm long; receptacle subglobose to ellipsoid, c. 0.7 cm diam when dry, non-stipitate, brownish to yellowish puberulous, glabrescent, without lateral bracts, colour at maturity unknown, apex convex; ostiole c. 3.5 mm diam, most of the ostiolar bracts whitish puberulous; internal hairs abundant.

Distribution — Indonesia, Papua, Bird's Head Peninsula.

Habitat & Ecology — Not clear from label data; probably mostly open places near rivers.

Additional specimen examined. *W. Ave 4241* (L), Indonesia, Papua, nr. Ayawasi, 450 m, 23 Feb. 1996.

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Fig. 1 *Ficus porata* C.C.Berg. Leafy twig without inflorescences and leafy twig with a cluster of inflorescences (*Janda Y068*, L).

Fig. 2 *Ficus sorongensis* C.C.Berg. Leafy twigs with figs (*Pleyte 517*, L).

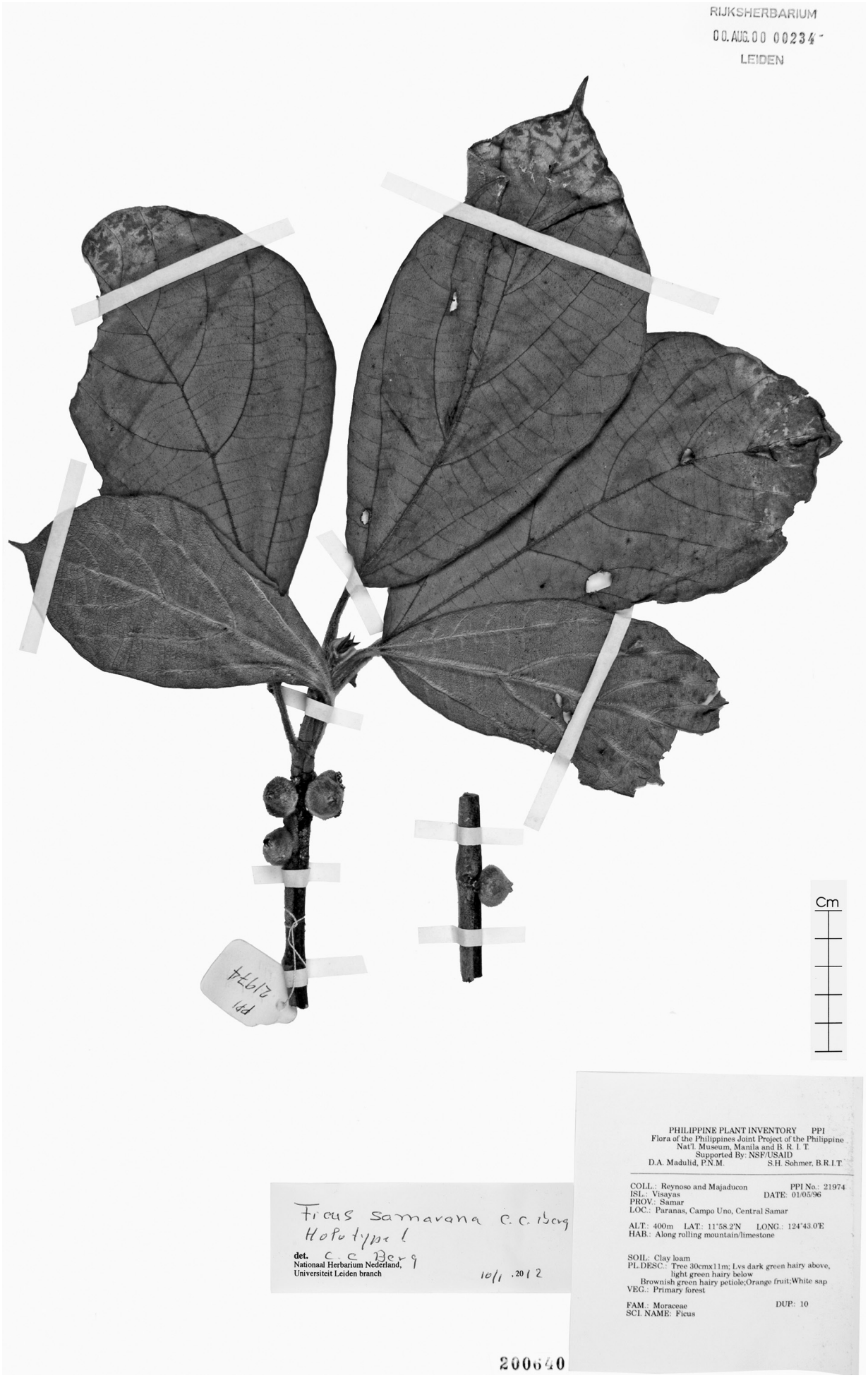

Fig. 3 *Ficus samarana* C.C.Berg. Leafy twigs with inflorescences and leafless part of a twig with an inflorescence (*Reynoso & Majaducon PPI 21974*, L).

Note — The species shows affinities to *F. arbuscula* Lauterb. & K.Schum. from which it differs, e.g., in the conspicuous indumentum on various parts when young, the persistent epidermis of the petiole, the smaller (sub)sessile figs without lateral bracts and the hairy ostiolar bracts.

II. A NEW SPECIES FROM THE PHILIPPINES

Studies on PPI material received from BRIT for identification led to some discoveries regarding the *Ficus* flora of the Philippines (Berg & Corner 2005), such as the presence of *F. fulva* Blume and *F. montana* Burm.f. in Palawan, the presence of *F. racemosa* L. in Luzon, the redefinition of *F. benguetensis* Merr., the reinstatement of *F. laevicarpa* Elmer (Berg 2011), and the establishment of the following new species.

Ficus samarana C.C.Berg, *sp. nov.* — Fig 3

Ficu fulvae similis laminis subobovatis basi obtusa, petiolo epidermide exfoliacae, stylis glabris differt. — Typus: *Reynosa & Majaducon PPI 21974* (holo L; iso K), Philippines, Samar, Isl., Visayas, Paranas, Campo Uno, 400 m, 1 May 1996.

Tree up to 30 m tall. *Leafy twigs* 5–8 mm thick, brown velutinous to subhirsute, glabrescent. *Leaves* spirally arranged, lamina subcoriaceous, subobovate to obovate, 13–22 by 6–12 cm, apex acuminate, base obtuse, margin (sub)entire; upper surface brownish hirtellous, densely so on the main veins; lower surface brownish subhirsute, on the main veins to velutinous; lateral veins 5–6 pairs, the basal pair up to 1/2–2/3 the length of the lamina, branched, some also branched or furcate away from the margin; tertiary venation scalariform; glandular spots in the axils of the basal lateral veins; petiole 1.5–5 cm long, c. 2 mm thick, brownish subhirsute and whitish subtomentose, the epidermis flaking off; stipules c. 1 cm long, brown strigose on and near the keel. *Figs* below the leaves, sessile; basal bracts c. 3 mm long, brown appressed-puberulous; receptacle 1.2–1.5 cm diam when dry, brownish subvelutinous; orange at maturity; ostiole 3–4 mm diam, prominent to rosulate, the outer ostiolar bracts brown appressed-puberulous; internal hairs abundant, whitish. *Tepals* dark red, glabrous. *Style of long-styled flower* glabrous. *Pedicel* hairy towards the base.

Distribution — Only known from Samar.

Habitat — Unknown.

Additional collection. *Guttierez et al. 11024* (L), Philippines, Samar, Mt Sohoton, Tekolo, Apr. 1970.

Note — This species is apparently related to *F. fulva* (in the Philippines known from Palawan), from which it differs in the subobovate to obovate lamina with an obtuse base, the exfoliating epidermis of the petiole, and moreover, in the glabrous style and partly hairy pedicel.

III. A NEW STOLONIFLOROUS SPECIES FROM BORNEO

There are three Bornean species of sect. *Sycocarpus* Miq. with a rather unusual type of indumentum, predominantly consisting of brownish to white long silky hairs covering the leafy twig, (part of) the stipules, the petiole, and (partly) the upper and lower surface, and the margin of the lamina. The first one described, *F. cereicarpa* Corner (Corner 1960) has relatively large leaves, laminas with cordate to subcordate bases, with most to some of the lateral veins furcate away from the margin and with waxy glandular spots in the furcations, and long petioles and stipules. The figs are born on stout up to 30 cm long leafless branchlets on the trunk; they vary considerably in the length of the peduncle, the presence of (curved) lateral bracts, from numerous to few or none, and in the shape of the receptacle from globose to subobovoid, with or without ribs, and (initially) with brown to whitish villous indumentum or without. The second one described, *F. albomaculata* C.C.Berg (Berg 2004) has smaller laminas with cuneate to obtuse bases and none of the lateral veins furcate away for the margin; the petioles and stipules are shorter than in the former species and the figs are borne on up to 7 cm long stout leafless branchlets on the trunk; they are turbinate to subglobose, up to 4 cm long pedunculate, ribbed towards the apex, without lateral bracts and (initially) brown puberulous. The third one, presently described, has laminas quite similar to those of *F. albomaculata*, but the figs are borne on short slender leafless branches on the main branches (and also the trunk?) and on up to 3 m long stolons departing from the lower part of the trunk. The figs are subglobose, brown hirtellous, and with numerous curved lateral bracts, resembling the figs of *F. uncinata* (King) Becc. and allied species, see Berg & Chantarasuwan (2007). Internal hairs are absent and the styles of the long-styled flowers are glabrous, in contrast to the two other species.

Ficus temburongensis C.C.Berg, *sp. nov.* — Fig. 4

Ficu albomaculata similis, ramuli floriferus tenuibus ad 3 m longis, fici receptaculo subgloboso, bracteis lateralibus brunnee hirtellis numerosus curvatis, pilosum internorum et in stylis absentia distincta. — Typus: *Coode et al. 7957* (holo L; iso AAU), Brunei, Temburong, Batu Apoi, Selapon, 30 m, 30 Jan. 1994.

Tree 5 m tall. *Leafy twigs* 2–5 mm thick, predominantly white to brownish sericeous to subvillous and also with short whitish hairs, without nodal glands. *Leaves* spirally arranged, subcoriaceous to chartaceous, oblong, 9–22 by 2–7.5 cm, apex acuminate, base cuneate to rounded to narrowly truncate, margin entire white sericeous, upper surface white sericeous, glabrescent; lower surface white sericeous on the main veins and to white puberulous to subtomentose on the smaller veins; cystoliths present only beneath; lateral veins 6–10 pairs, none of them furcate away from the margin, the basal pair up to 1/10–1/6 the length of the lamina, tertiary venation scalariform; glands absent; petiole 1–6 cm long, 1–2.5 mm thick, white to brownish sericeous, the epidermis flaking off; stipules c. 2 cm long, white appressed-puberulous, at the keel and the base white to brownish sericeous to subvillous, caducous. *Figs* on short slender branchlets on the branches (and trunk?) and on up to 3 m long stolons departing from the lower part of the trunk, subsessile, basal bracts 3–4(–5), 2–5 mm long, brown subhispidulous, receptacle subglobose 1–1.2 cm diam, red-brown hirtellous, with numerous, ± curved brown-hairy lateral bracts; ostiole 5–6 mm diam, with the bracts pointing upwards; internal hairs absent. *Style of the long-styled flower* glabrous.

Distribution — Borneo.

Habitat — Alluvial forest, at low altitude.

Additional specimen. *Ridsdale PBU.189A* (L), Indonesia, Kalimantan, Tenah, Barito Ulu, 0 m, 25 May 1990.

Notes — 1. *Ridsdale PBU.189* (L) is a mixed collection with a separate 'fruit collection' containing material of *F. cereicarpa*, related to the label data; the part with leafy twigs and separate figs matching those of the type collection is to be indicated as *Ridsdale PBU.189A*.

2. Attempts to trace duplicates of the type in the herbaria BRUN and K failed.

3. The new species can be keyed out in the key for Bornean stoloniflorous species constructed by Berg & Chantarasuwan (2007) by adding between lead 1 and 2:

2. Leafy twigs and main veins of the lamina densely white (to slightly brownish) sericeous; apex of the lamina acuminate . . . . . *F. temburongensis*

Fig. 4 *Ficus temburongensis* C.C.Berg. Leafy twig and stolons with inflorescences (*Coode et al. 9757*, L).

2. Leafy twigs and main veins of the lamina beneath predominantly brown hirtellous, if whitish, then short and sparse, or if yellowish, then the apex of the lamina caudate . . . . . .

IV. TWO NEW SPECIES FROM SULAWESI

During the preparation of Flora Malesiana (Berg & Corner 2005) it became clear, as from the descriptions of new *Ficus* species (Berg 2003a–c, 2004) and the poor representation of several already described species, that further botanical exploration of Sulawesi would yield many more species than hitherto known, two recently published (Berg & Culmsee 2011), and two included in the present publication.

Ficus buntaensis C.C.Berg, *sp. nov.* — Fig. 5

Ficu subcongesta similis, laminis angustioribus, lanceolatis contra oblongis, venis lateralibus basalibus laminae longitudinae 1/20–1/10, pedunculo ad 0.2 cm longo differt. — Typus: *Hendrian*, *Newman*, *Scott*, *Saleh & Supriadi 933* (holo E), Indonesia, Sulawesi, Luwuk District, Bunta Subdistrict, Gunung Hek, Sungai Hek, 26 Feb. 2004.

Tree up to 7 m tall. *Leafy twigs* 2.5–5 mm thick, densely whitish hirtellous, the hairs curved (upwards) and with thickened bases; nodal waxy glands absent; internodes hollow; periderm of the older parts flaking off. *Leaves* spirally arranged to subdistichous or (sub)opposite; lamina lanceolate, 12–27 by 3–6.5 cm, almost symmetric to slightly asymmetric at the base, chartaceous to subcoriaceous, apex acuminate to subcaudate, base rounded to obtuse, margin dentate, slightly revolute; upper surface white hirtellous to subhispid on the veins, scabrous, lower surface white hirtellous to hispid, scabrous, cystoliths only beneath; lateral veins 8–12 pairs, the basal pair to 1/20–1/10 the length of the lamina, faintly branched, often 1–2 pairs of smaller lateral veins below the main pair, tertiary venation loosely scalariform; waxy glands small, in the axils of some of the lateral veins in and above the middle part of the lamina; petiole 1–3.5 cm long, c. 2 mm thick, whitish hirtellous, the epidermis ± flaking off; stipules 1.5–2 cm long, whitish to brownish strigose to hirtellous, subpersistent or caducous. *Figs* axillary or on unbranched or shortly branched up to 2 m long leafless branchlets on the lower part of the trunk, internodes to 4 cm long, often with some 0.8–1.2 cm long, with subpersistent stipules (or not?), rooting if reaching the soil; subsessile or with a peduncle up to 0.2 cm long; basal bracts 3, subverticillate, 2–3 mm long; receptacle subglobose, 0.8–1.3 cm diam when dry, non-stipitate, sparsely to densely whitish to brownish strigillose to puberulous, with curved hairs (glabrescent), without lateral bracts, mostly ribbed, lenticellate and the epidermis flaking off, red at maturity, apex convex; ostiole c. 1.5 mm diam, surrounded by 5 cushion-shaped apical bracts or elevated ends of ribs; internal bristles sparse. *Styles of long-styled flower* hairy.

Distribution — Indonesia, Central Sulawesi.

Habitat — Evergreen forest, at altitudes of 600–1000 m.

Additional specimens seen. *Hendrian et al. 951* (E), *956* (E), Indonesia, Sulawesi, Luwuk District, Bunta Subdistrict, Gunung Hek, Sungai Hek, 27 Feb. 2004; *Hendrian et al. 819* (E), Poso District, Ulubonka Subdistrict, Mire, Gunung Katopas, 1270 m, 19 Feb. 2004.

Note — This species shows similarities to the New Guinean *F. subcongesta* Corner, from which it differs by the narrower lamina with much shorter basal lateral veins and the much shorter peduncle of the fig. It also shows similarities to *F. parvibracteata* Corner, a species of Sulawesi, which clearly differs in the unbranched basal lateral veins, running close to the margin, the longer thinner petioles with persistent epidermis. Moreover, it shows similarities to *F. tunicata* Corner, probably an endemic of the Great Kei Island, from which it differs in the narrower lamina, the much longer fig-bearing branches and the (initially) hairy fig receptacle.

Ficus flavistipulata C.C.Berg, *sp. nov.* — Fig. 6

Ficu camptandra similis indumento breviore breviter luteolo ad albido, glandulis ceraceis in nervorum basalium lateralium extensionibus, receptaculo apice crateriformi differt. — Typus: *Mendum et al. 165* (holo BO; iso E, L), Indonesia, Sulawesi, Gorontalo, Gunung Boliohuto, 23 Apr. 2002.

Tree to 20 m tall, with short buttresses. *Leafy twigs* 2–5 mm thick, solid, (minutely) whitish to yellowish puberulous to glabrous; periderm persistent. *Leaves* laxly spirally arranged to subdistichous; lamina (sub)coriaceous, oblong to elliptic, 6–14 by 3–7.7 cm, apex acuminate, base rounded to cuneate, margin subentire; upper surface glabrous, smooth, lower surface whitish puberulous to subtomentose, mainly on the veins, or only on the midrib; cystoliths only beneath; lateral veins 4–8 pairs, not furcate away from the margin, the basal pair up to 1/10–1/3 the length of the lamina, departing away from the base of the lamina, mostly branched; tertiary venation subscalariform, flat; waxy glands in slit-shaped extensions of the basal lateral veins; petiole 1–5.5 cm long, 1.5–2 mm thick, whitish puberulous, the epidermis flaking off; stipules c. 1 cm long, yellow-appressed-puberulous to subsericeous, caducous. *Figs* on (clusters of) up to 20 cm long leafless branchlets, on the older wood; peduncle 0.5–3 cm long, basal bracts verticillate, 1–1.5 mm long, persistent; receptacle subglobose, 1–1.5 cm diam, to 1.5 cm long stipitate, glabrous, the apex crateriform; ostiole more or less sunken, 2–2.5 mm diam, with the upper bracts (always?) minutely white appressed-puberulous; internal hairs very sparse to absent. *Pistillate flowers*: tepals reddish, free; ovary stipitate, style of long-styled flowers glabrous. *Fruits* with lateral ribs.

Distribution — Indonesia, northern and southern Sulawesi.

Habitat — Forest, at altitudes up to 450 m.

Additional collections examined. *Kofman 195* (L), Indonesia, Sulawesi, Selantan, S of Soroako, 18 Oct. 1993; *Mendum et al. 216* (E, L), Indonesia, Sulawesi, Gorontalo, Gunung Boliohuto, 25 Apr. 2002.

Notes — 1. The features of the pistillate flowers and the fruits point at membership of subg. *Synoecia*, the subdivision of root-climbers; by the lack of staminate flowers the systematic position cannot be confirmed. However, all labels of the collections included mention tree as the life form, apparently not by mistake. A similar life form and phyllotaxis, as well as the (long) fig-bearing branchlets on the older wood, is found in *F. anserina* (Corner) C.C.Berg (2007b). Accepted as a member of *Synoecia*, this species shows affinities to *F. camptandra* Diels, from New Guinea, one of the ramiflorous to cauliflorous representatives of section *Rhizocladus* subsection *Punctulifoliae* Sata (see Berg & Corner 2005).

2. This new species differs from *F. camptandra*, except for the habit, phyllotaxis and long fig-bearing branchlets, in the much shorter, yellowish to whitish indumentum on various plant parts, making the stipules yellowish, the flat tertiary venation, the crateriform apex of the fig receptacle, and the position of the waxy glands, namely in slit-shaped extensions of the basal lateral veins, such as can be found in the species of sect. *Neomorphe* King of subg. *Sycomorus* (Gasp.) Miq. (see Berg & Corner 2005).

3. There is a clear variation in the length of the basal lateral veins, which depart away from the base of the lamina as their bases run parallel to the midrib and cause the slits containing the waxy glands.

4. This new species can be keyed out in the Regional key for Celebes (Berg & Corner 2005: 487) by inserting this lead before the old lead 6 by:

6. Waxy glands in slit-shaped extensions of the basal lateral veins . . . . . *F. flavistipula*
6. Waxy glands not in slit-shaped extension of the basal lateral veins . . . . . old lead 6

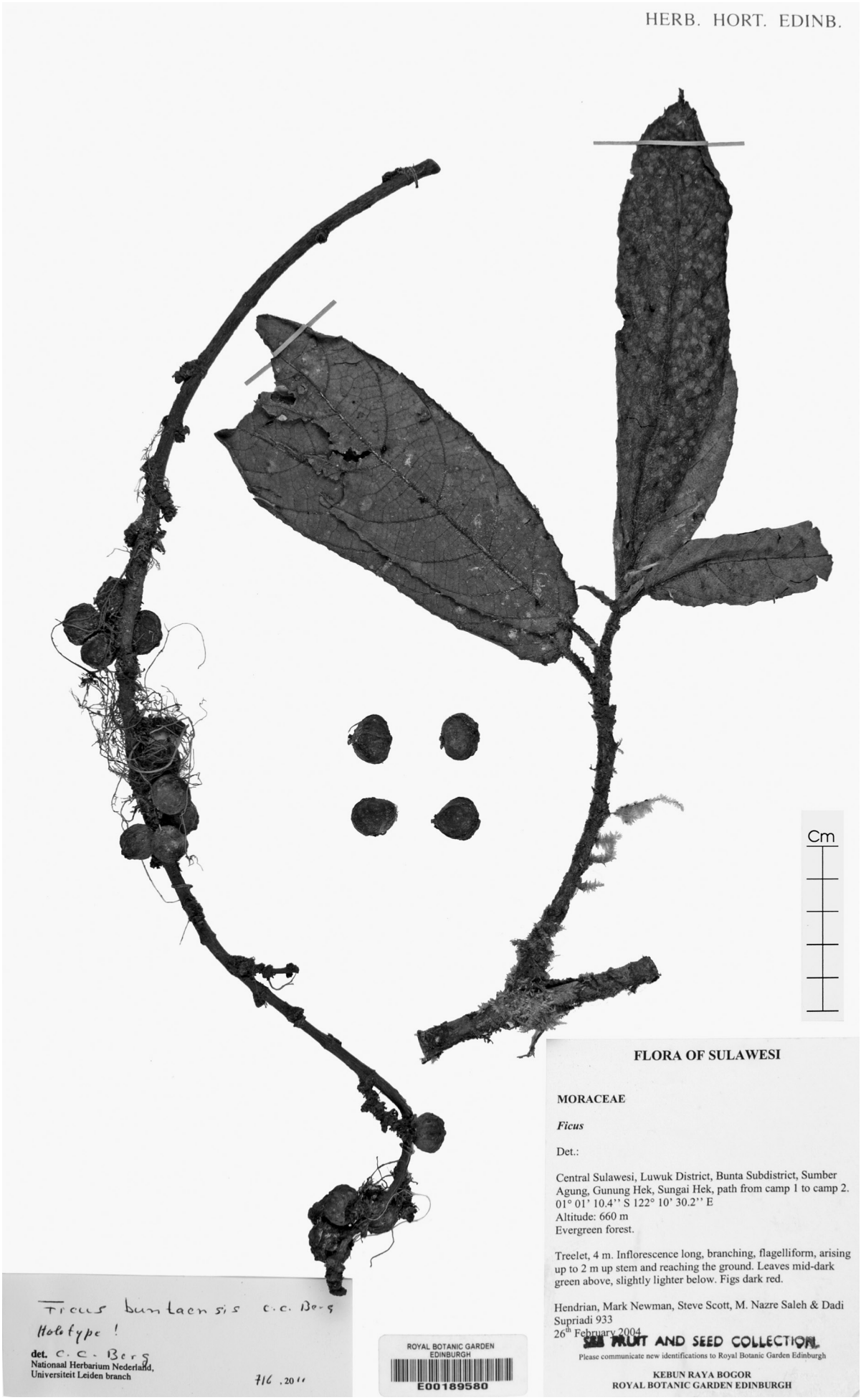

Fig. 5 *Ficus buntaensis* C.C.Berg. Leafy twig and stolon with figs (*Hendrian et al. 933*, E).

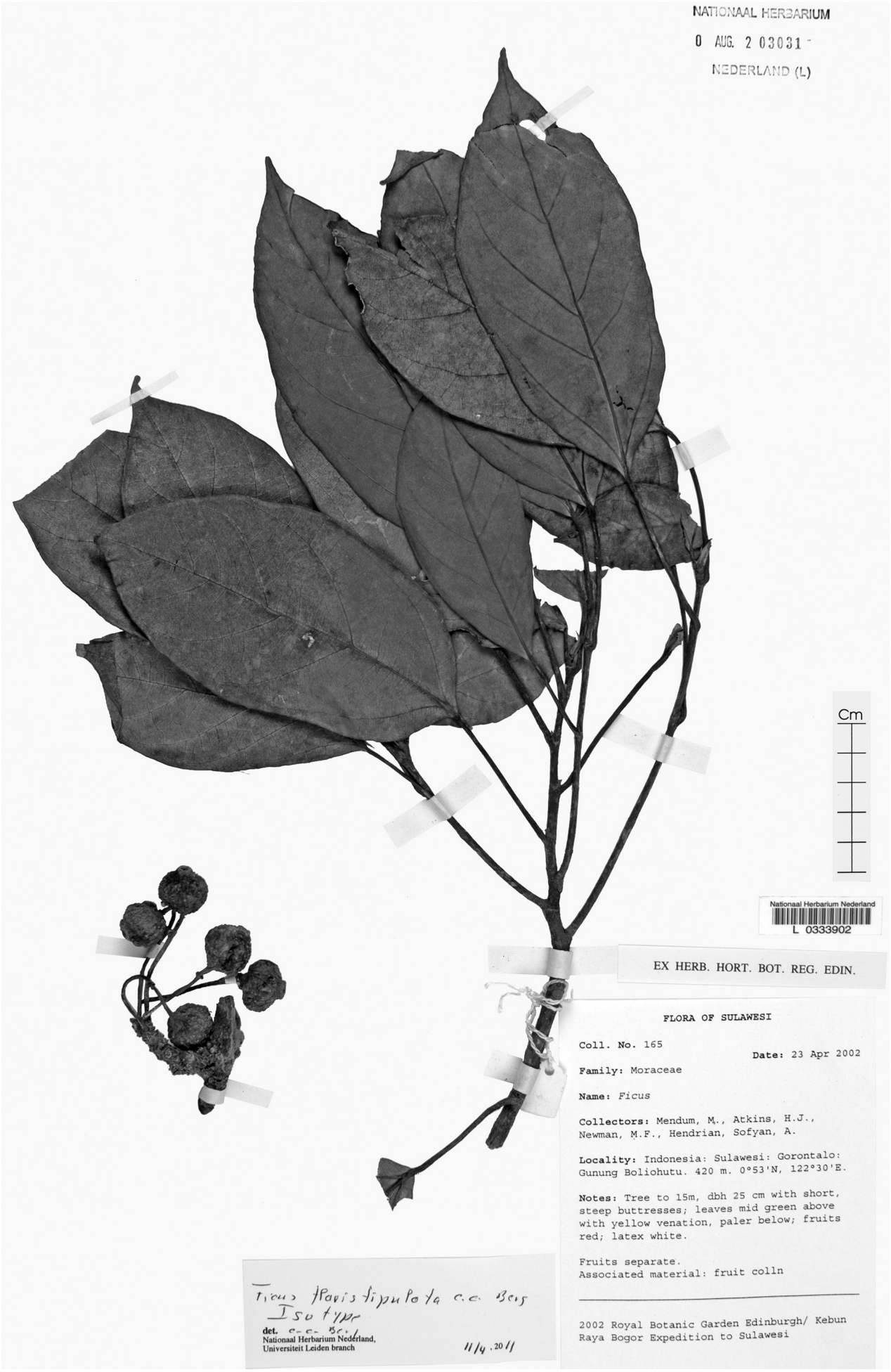

Fig. 6 *Ficus flavistipulata* C.C.Berg. Leafy twigs and leafless branchlets with figs (*Mendum 165*, L).

Fig. 7 *Ficus jambiensis* C.C.Berg. Leafy twigs with figs (*Morley & Kardin 445*, L).

V. A NEW SPECIES FROM SUMATRA

Even in the relatively well-explored island of Sumatra new species of *Ficus* can still be discovered (Berg 2004, 2007b) and now this species.

Ficus jambiensis C.C.Berg, *sp. nov.* — Fig. 7

Ficu litseifoliae similis, petiolis et bracteis basalibus longioribus, ficibus sessilibus, ostiolo annulo circumcinto differt. — Typus: *Morley & Kardin 445* (holo L), Indonesia, Sumatra, Jambi, Kerinci, lake Gunung Tujuh, 2000 m, 11–14 Aug. 1972.

Tree 10–15 m tall. *Leafy twigs* 4–5 mm thick, ± densely white appressed-puberulous to strigillose; periderm persistent. *Leaves* spirally arranged; lamina coriaceous, oblong to elliptic, 5–16 by 2.5–7.5 cm, apex acuminate, base obtuse to rounded, margin entire; upper surface whitish to yellowish hirtellous to strigillose, scabridulous, lower surface yellowish to whitish puberulous to subsericeous on the main veins and to tomentose on the smaller veins, smooth; lateral veins 5–7 pairs, the basal pair to 1/4–1/3 the length of the lamina, branched, tertiary venation (sub)scalariform; waxy glands present in the axils of the basal lateral veins; petiole 1–4.5 cm long, 1–2 mm thick, yellowish puberulous, the epidermis persistent; stipules c. 0.6 cm long, yellowish appressed-puberulous to subsericeous, caducous. *Figs* axillary, sessile: basal bracts 2–2.5 cm long, yellowish appressed-puberulous; receptacle subglobose, c. 0.8 cm diam when dry, sparsely minutely yellowish appressed-puberulous towards the apex, colour at maturity unknown, ostiole 2.5–3 mm diam, surrounded by a rim, upper ostiolar bracts hairy; internal hairs present; tepals dark red, glabrous.

Distribution — South-eastern Sumatra, the species is only known from its type collection.

Habitat — In montane forest.

Note — The new species resembles both *F. litseifolia* Corner (a species of montane forest in Sumatra, Atjeh) and *F. oreophila* Ridl. (a montane species of Peninsular Malaysia and Thailand) but is clearly distinct in the sessile figs with the ostiole surrounded by a rim; moreover, the petiole extends the maximum length of that of the two species and the basal bracts are longer. These three species constitute a set of closely related montane species, which also may include *F. cambodica* Gagnep., see Berg (2007b).

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