

**MALESIAN SPECIES OF *FISSISTIGMA* (ANNONACEAE)
JENIS-JENIS *FISSISTIGMA* (ANNONACEAE) DI MALESIA**

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Budi Irawan. 2005. Kajian taksonomi mengenai marga *Fissistigma* Griff. (Annonaceae) di kawasan Malesia telah dilakukan berdasarkan karakter morfologi. Lima belas jenis dan satu varietas diperoleh dari hasil penelitian ini, meliputi dua belas jenis dan satu varietas yang sudah dikenal (*F.borneense*, *F.elmeri*, *F.fulgens*, *F.hypoglaucum*, *F.kinabaluense*, *F.kingii*, *F.lanuginosum*, *F.latifolium*, *F.latifolium* var. *ovoideum*, *F.litseaefolium*, *F.longipes*, *F.manubriatum* dan *F.rubiginosum*), tiga jenis (*F.cordifolia*, *F.magnisepala* dan *F.sumatrana*) diusulkan sebagai jenis baru. Satu jenis dikeluarkan dari marga *Fissistigma* dan dipindahkan ke marga *Mitrella*, yaitu *F. clementis*. Selain itu empat jenis tidak diperoleh specimennya. Kunci identifikasi disediakan untuk mengidentifikasi jenis-jenis *Fissistigma* di Malesia.

Kata Kunci: Taksonomi, Revisi, *Fissistigma*, Malesia

Budi Irawan. 2005. A taxonomic study of the genus *Fissistigma* Griff. (Annonaceae) in Malesia was conducted based on morphological characters. Beside the four incompletely known species, fifteen species and one variety are recognized, consisting of previously known twelve species and one variety (namely *F.borneense*, *F.elmeri*, *F.fulgens*, *F.hypoglaucum*, *F.kinabaluense*, *F.kingii*, *F.lanuginosum*, *F.latifolium*, *F.latifolium* var. *ovoideum*, *F.litseaefolium*, *F. longipes*, *F.manubriatum* and *F.rubiginosum*), and three proposed new species (namely *F.cordifolia*, *F.magnisepala* and *F.sumatrana*). One species (*F.clementis*) is excluded from *Fissistigma* as it belongs to *Mitrella*. An identification key to the species is included.

Key Word: Taxonomy, Revision, *Fissistigma*, Malesia

INTRODUCTION

Fissistigma is one of the genus of *Annonaceae* which has a climbing habit with simple hairs. It is distributed in East India to Northeast Australia (Kessler 1993). The genus was first established by William Griffith (1854) with a single species *Fissistigma scandens* Griff, which is thus the type of the genus.

The genus *Fissistigma* had been confused with the shrubby or treelet genus *Melodorum* Lour. because Hooker f. & Thomson proposed a new genus *Melodorum* based on *Melodorum latifolium* (Dunal) Hook.f & Thomson. Later authors [Miquel (1858), King (1892; 1893), Boerlage (1899) and Ridley (1912; 1913; 1922)] followed Hooker f. and Thomson, until Merrill (1919) showed that *Melodorum* Hook. f. & Thomson is a synonym of *Fissistigma* Griff.

Based on the climbing habit and simple hairs, Merrill included *Mitrella* and *Pyramidanthe* in *Fissistigma*. However, Miquel (1858), Boerlage (1899), Sinclair (1955), Heusden (1992) and Kessler (1993) considered that *Mitrella* and *Pyramidanthe* distinct genera, because their leaves have no scalariform venation and the size of their inner petals is very much shorter than the outer ones (see Table 1).

Table1. Morphological character differences between *Fissistigma*, *Mitrella* and *Pyramidanthe*

Character	<i>Fissistigma</i>	<i>Mitrella</i>	<i>Pyramidanthe</i>
1. Leaf venation	scalariform	not scalariform	not scalariform
2. Size of petals (outer & inner)	slightly equal (inner smaller than outer)	inner very much shorter than outer	inner very much shorter than outer
3. Flower bud	conical or elongated conical	triquetrous	lanceolate or long pyramidal
4. Carpel	hairy	glabrous	hairy
5. Stamen	tongue-shaped	tongue-shaped or discoid	discoid

Including *Mitrella* and *Pyramidanthe*, Merrill (1919) reported the number of species of *Fissistigma* to be about 50, while Kessler (1993) estimated about 60 species. The exact number of *Fissistigma* in Malesia is not known yet. From Malaya Sinclair (1955) reported eight species and one variety, namely *F. litseaefolium* (King) Merr., *F. hypoglaucum* (Miq.) Merr., *F. fulgens* (Hookf. & Thomson) Merr., *F. manubriatum* (Hook.f. & Thomson) Merr., *F. lanuginosum* (Hook.f. & Thomson) Merr., *F. kingii* (Boed.) Burkill, *F. latifolium* (Dunal) Merr., *F. latifolium* (Dunal) Merr. var. *ovoideum* (King) J. Sinclair, and *F. rubiginosum* (ADC.) Merr. Backer and Bakhuizen f. (1963) treated two species from Java, namely *F. latifolium* (Dunal) Merr. and *F. sphaerocarpum* (Blume) Merr., but apparently they belong to the same species. Kessler and Heusden (1993) reported four species from Balikpapan-Samarinda, East Kalimantan, i.e. *F. borneense* (Miq.) Merr., *F. kingii* (Boerl.)Burkill, *F. latifolium* (Dunal) Merr. and *F. manubriatum* (Hook.f.&Thomson) Merr.

The aims of this study are to delineate generic and species concept, to know the species diversity in Malesia, to provide generic and species description, to make identification key to the species based on morphological characters and to know the distribution pattern of the species. This information can be used for basic knowledge of the species, development and conservation in the future.

MATERIAL AND METHODS

This research was conducted in Herbarium Bogoriense (BO) based on 285 sheets of herbarium specimens from BO and living collections at Bogor Botanical Garden. This research used descriptive method based on morphological characters. Terminology by Stearn (1992) and Harris & Harris (1994) were used, whereas the revision method adopted followed those as described by Leenhouts (1968), Rifai (1976), de Vogel (1987) and Maxted (1992). This procedure used is as follows: select all herbarium specimen of *Fissistigma* from Malesia Region, sort the specimens into groups according their overall

resemblances, gather the literatures, study and describe the grouped specimens, analysis the data, delineate the taxa, make an identification key and study the nomenclature.

RESULT AND DISCUSSION

MORPHOLOGICAL CHARACTERS

Characters of indument, leaf and flower found useful in delimitation and identification of species in *Fissistigma*. The indument (especially beneath the leaves) generally are pubescent or tomentose, whereas in some species are lanuginose (*F.lanuginosum*), sericeous (*F.manubriatum*) and velutinous (*F.kingii*). The indument of *F.fulgens* is shining.

Generally, the leaves are ellips to oblong, but in *F.cordifolia* it is obcordate, *F.sumatrana* and *F.bomeense* it is obovate. Rounded type of leaf base is found in most *Fissistigma*, whereas cuneate type can be observed in *F.bomeense*, *F.cordifolia* and *F.sumatrana*. Leaf apex is not a good character to be used for species delimitation, but in this study I found that of *F.magnisepala*, *F.sumatrana* and *F.cordifolia* has caudate, cuspidate and emarginate leaf apex respectively.

The inflorescence generally is few flowered (c. 2 - 5 flowered) paniculate or cymous. However the flowers in *F.cordifolia*, *F.magnisepala* and *F.kinabaluense* are solitary. They are terminal, axillary or leaf opposed, except in *F.cordifolia* and *F.magnisepala* which are ramuliflorus. The flowers are pedicelate. The longest pedicels are *F.longipes* and *F.kinabaluense* (up to 5 cm long). The distinctly very short pedicels (somewhat sessile) are found in the ramuliflorus species *F.magnisepala* and *F.cordifolia* (less than 0.5 cm long).

Mostly *Fissistigma* have a conical flower bud, but in *F.elmeri*, *F.sumatrana*, *F.rubiginosum*, *F.hypoglaucum* and *F.longipes* they are elongatedly conical. The above characters are correlated with the shape of the outer petals. The species with conical flower bud has ovate to broadly ovate outer petals, whereas the other ones have lanceolate-linear outer petals.

The apex of the sepals majority of the species in *Fissistigma* are acute, but rounded type can be observed in *F.cordifolia*. Sometimes, the sepals are persistent when fruiting (i.e in *F.manubriatum* and *F.magnisepala*). Sepal vein is not prominent, except in *F.magnisepala*. The largest sepal is in *F.magnisepala* (12 mm long).

Stamens are numerous (more than 60). It has fleshy texture and tongue-shaped. The narrowly apical prolongation of stamens are found in *F.cordifolia*, *F.elmeri*, *F.fulgens*, *F.rubiginosum* and *F.sumatrana*. The carpels (Fig. 1) are curved or elongated, tomentose or pubescent and long haired. Stigma shape are acute, clavate or axe-shaped, with or without hairs, somewhat split (clear in *F.latifolium*, *F.manubriatum* and *F.fulgens*).

Figure 1. Variation of carpel - 1. stigma, 2. ovary; a. acute stigma in *F. borneense* (x 20), b. clavate stigma in *F. latifolium* (x 20), c. axe-shaped stigma in *F. cordifolia* (x 20) [a: Vogel 5627; b: Winckel 339B; c: v Balgooy & v Setten 5559)

GEOGRAPHICAL DISTRIBUTION

Borneo has the highest number of species of *Fissistigma* (twelve), followed by Sumatra and Malay Peninsula (nine), Celebes (three), whereas Java, Philippines and Mollucas have only one species. *F. latifolium* has wide distribution and it is found in Sumatra, Malay Peninsula, Borneo, Java, Celebes, Philippines and Mollucas. There are five endemic species found in Sumatra (*F. sumatrana*), Malay Peninsula (*F. lanuginosum*) and Borneo (*F. cordifolia*, *F. kinabaluense* and *F. magnisepala*).

Table 2. Species distribution of *Fissistigma* in Malesia

Name of Species	Area Distribution						
	Sum.	Mal. Pen.	Jav.	Bor.	Cel.	Mol.	Phi.
1. <i>F. borneense</i>				*	*		
2. <i>F. cordifolia</i>				*			
3. <i>F. elmeri</i>	*			*			
4. <i>F. fulgens</i>	*	*		*			
5. <i>F. hypoglaucum</i>	*	*		*			
6. <i>F. kinabaluense</i>				*			
7. <i>F. kingii</i>	*	*		*	*		
8. <i>F. lanuginosum</i>		*					
9. <i>F. latifolium</i>	*	*	*	*	*	*	*
10. <i>F. latifolium</i> var. <i>ovoideum</i>		*					
11. <i>F. litseaefolium</i>	*	*					
12. <i>F. longipes</i>	*			*			
13. <i>F. magnisepala</i>				*			
14. <i>F. manubriatum</i>	*	*		*			
15. <i>F. rubiginosum</i>		*		*			
16. <i>F. sumatrana</i>	*						
Total	9	9	1	12	3	1	1

Note: Sum. = Sumatra, Mal.Pen.= Malay Peninsula, Jav. = Java, Bor.= Borneo, Cel. = Celebes, Mol. = Mollucas, Phi. = Philippines.

TAXONOMY

GENERIC DESCRIPTION

Fissistigma Griff.

Fissistigma Griff., Notul. As. 4 (1854)706; Merr., Philipp. J. Sci. 15 (1919) 130; Sinclair, Gard. Bull. Str. Settl. 14 (1955) 349; Backer & Bakh.f., Fl. Jav 1 (1963) 114;

Heusden, *Blumea* Supl. 7 (1992) 69; Kessler *in* Kubitzki, *Fam. Gen. Vas. Pl.* (1993) 121; Kessler & Heusden, *Rhedeia* 3 (1)(1993) 63. -- Type species: *Fissistigma scandens* Griff.

Melodorum auct. non Lour., Hook f. & Thomson, *F1. Ind.* 1 (1855) 115 et in *F1. Brit. India.* 1. (1875) 78; Miq., *F1. Ind. Bat.* 1 (1858)34; King, *J. Asiat. Soc. Bengal.* 61 (1892) 101; King, *Ann. Roy. Bot. Gard. (Calcutta)* 4 (1893) 129; Boerl., *Icon. Bogor.* 1 (1899) 132; Ridl., *Kew Bull.*(1912) 386; Ridl., *Sarawak Mus. J.* 1 (1913) 90; Ridl., *Fl. Malay. Penins.* 1 (1922) 82. -- Type species: *Melodorum latifolium* (Dunal) Hookf. & Thomson

Woody climber, covered by simple hairs. Young twigs terrete, tomentose or pubescent, afterward glabrous with numerous lenticels. Leaves simple, alternate, chartaceous to coriaceous; upper surface glabrous to glabrescent or pubescent; lower surface sparsely to densely hairs; midrib prominent beneath, pubescent or tomentose in both surface; lateral veins anastomosing or not anastomosing, prominent beneath; leaf venation scalariform. Inflorescence solitary, paniculate or cymous; axillary, terminal, leaf-opposed or ramuliflorous. Flower bisexual, actinomorph and epigynous. Flower bud conical or elongated conical, covered with hairs, subsessile to pedicelous. Bracteole 1 - 2, coriaceous, triangular or ovate, acute to acuminate apex, hairy; basal, supra basal, sub median or median. Sepal 3, coriaceous, valvate, connate at base; triangular, ovate to broadly ovate, pubescent or tomentose outside, usually glabrous inside. Petal 6 in two whorls (outer and inner), fleshy, thick at the edge; outer petals ovate to broadly ovate or lanceolate-linear, densely hairs outside; glabrous inside; inner petals slightly equal or smaller than outer, glabrous in both surface, concave at base and triquetrous at the top. Stamen numerous (more than 60), fleshy, extrorse, tongue-shape, apical prolongation narrow or revolute. Carpel 6 - 30; elongated or curved, tomentose or pubescent; stigma acute, clavate or axe-shaped, somewhat split (clear in *F. latifolium*, *F. fulgens* and *F. manubriatum*); ovule few, lateral, in two series. Carpoidia ovoid, globose to sub globose or ellipsoid with a stalk, hairy. Seed several (c.10), in two series; brown to dark-brown, smooth and shiny.

IDENTIFICATION KEY TO THE MALESIAN SPECIES

1. a. Inflorescence solitary, axillary or ramuliflorous; lateral leaf nerve not anastomosing.....2
 - b. Inflorescence cymous or paniculate; axillary, terminal or leaf-opposed; lateral leaf nerves anastomosing or not anastomosing 4
2. a. Leaf not glaucous beneath; flower axillary; length of sepal \leq 3 mm long; pedicel slender, 5 cm long 6. *F. kinabaluense*
 - b. Leaf glaucous beneath; flower ramuliflorous; length of sepal > 3 mm long; pedicel sub sessile, 0.5 cmlong3
3. a. Leaf oblong, apex caudate; sepal large 12 mm long, sepal-vein prominent, apex acute 12. *F. magnisepala*
 - b. Leaf obcordate, apex emarginate; sepal small 5-6 mm long, sepal-veint not prominent, apex rounded 2. *F. cordifolia*
4. a. Flower bud conical; petal ovate to broadly ovate5

- b. Flower bud elongated conical; petallanceolate to linear 11
- 5. a. Leaf densely hairy beneath; leaf venation indistinct beneath6
- b. Leaf not densely hairy beneath; leaf venation distinct beneath7
- 6. a. Hairs lanuginose; stigma acute.....8. *F. lanuginosum*
- b. Hairs sericeous; stigma axe-shaped13.*F.manubriatum*
- 7. a. Leaf puberulous beneath, hair short (1 mm long).....8
- b. Leaf tomentose or velutinous beneath, hairs> 1mm long9
- 8. a. Indument not shining; lateral nerves 25; inflorescence paniculate; stigma acute;
 apical prolongation of stamen revolute 1. *F. borneense*
- b. Indument shining; lateral nerves 6 -14; inflorescence cymous; stigma clavate; apical
 prolongation of stamen narrow..... 4. *F. fulgens*
- 9. a. Leaf tomentose beneath; leaf pubescent above; lateral leaf nerve anastomosing; outer
 petal 2 - 2.5 cm 9. *F.latifolium*
- b. Leaf velutinous beneath; leaf velutinous or glabrous above; lateral leaf nerve not
 anastomosing; outer petal < 1.5 cm 10
- 10.a. Leaf not glaucous; stigma clavate.....7.*F.kingii*
- b. Leaf glaucous; stigma acute10.*F.litseaefolium*
- 11.a. Pedicels 3 - 5 cm long; leaf apex rounded, sometime slightly retuse11.*F.longipes*
- b. Pedicels 1 - 2.5 cm long; leaf apex acute, acuminate, emarginate or caudate12
- 12.a. Leaf chartaceous; lateral leaf nerves anastomosing; outer petal up to 3.5 cm long
 14.*F.rubiginosum*
- b. Leaf subcoriaceous; lateral leaf nerves anastomosing or not anastomosing;
 outer petal 1.5-2.5 cm long13
- 13.a. Leaf glaucous and puberulous beneath; apical prolongation of stamen revolute
 5. *F.hypoglaucum*
- b. Leaf not glaucous and pubescent beneath; apical prolongation of stamen
 narrow14
- 14.a. Lateral leaf nerves 33 pairs; leaf apex cuspidate; leaf base cuneate
 15. *F sumatrana*
- b. Lateral leaf nerves 14 -16 pairs; leaf apex acuminate or emarginate; leaf base
 rounded3. *F.elmeri*

SPECIES DESCRIPTIONS (Arranged alphabetically)

1. Fissistigma borneense (Miq.) Merr.

Melodorum borneense Miq., Ann. Mus. Bot. Ludg-Bat.2 (1865) 36. - *Fissistigma borneense* (Miq.) Merr., Phillip. 1. Sci. 15 (1919) 131; Kessler & Heusden, Rheedea 3(1) (1993) 63; Kessler et al, Blumea suppl. 4 (2002) 10. -- Type: Borneo australis, Korthals s.n. (holo L, not seen).

Climber up to 40 m tall, young twigs tawny tomentose. Leaves: petiole 1 cm long, 1.5 mm diameter; lamina chartaceous, obovate, 14 - 21 cm long, 6.5 - 9.5 cm wide; base cuneate; apex slightly retuse; glabrous above; tawny puberulous beneath; lateral nerve 25 pairs, not anastomosing. Inflorescence paniculate, axillary. Flower bud conical, 0.6 cm long, tawny pubescent. Flower: pedicels 1- 2 cm long, tawny pubescent with a small triangular median bracteole; sepals triangular, 3 mm long, tawny pubescent outside, glabrous inside; outer petal ovate, 1 cm long, 0.5 cm wide, tawny pubescent outside, glabrous inside; inner petals slightly smaller, 0.8 cm long; stamen numerous (c.70), 1.5 mm long, apical prolongation revolute; carpel 14, curved, 2 mm long, tomentose; stigma acute, hairy. Carpidia not seen.

Distribution: Borneo and Celebes.

Habitat & Ecology: disturbed in primary forest, on deep clayey soil derived from granite terrain sloping, at 650 m alt.

Field note: solitary climber, flowers bud is ochrish brown.

Vernacular name: wili ula (Kolawi Lang).

Specimen examined: CELEBES: Central Sulawesi, Supu valley, c. 60 km SSE of Palu, Vogel 5627.

2. *Fissistigma cordifolia* Irawan, sp. nov. (Fig.2)

Folia subcoriacea, obcordata, 17 cm longa, 9 cm lata; apice emarginatus, basi cuneatus; superne glabrosa vel glabrescent; subtus glaucous, rusty tomentosa; nervis 12 jugis, superne inconspicuis, subtus prominulis. Inflorescentia solitaria, ramulifloris, 1 cm longa. Pedicelis brevis, sub sessilis. Sepala ovata, rotundata, 5 - 6 mm longa, rusty tomentosa. Petala interiora ovata, acuta, rusty tomentosa, 0.8 cm longa. Stamina c. 85, 1.5 - 1.7 mm longa. Carpela c. 25, elongate, 2 mm longa. -- Typus: Borneo, West Kalimantan, Gn Palling Nature Reserve, June 31st, 1986, v *Balgooy* & v *Setten* 5559 (holo BO!, iso BO!).

Young twigs rusty tomentose. Leaves: petiole rusty tomentose, 1.5 - 2 cm long, 2 mm diameter; lamina subcoriaceous, obcordate, 17 cm long, 9 cm wide; base cuneate; apex emarginate; glabrous to glabrescent above; rusty tomentose, glaucous beneath; lateral nerve 12 pairs, not anastomosing. Inflorescence solitary, ramuliflorous. Flower bud conical, 1 cm long, rusty tomentose. Flower: pedicels short (sub sessile), 0.4 cm with a basal bracteole, broadly ovate, 4 mm long, rusty tomentose; sepal broadly ovate, rounded, 5 - 6 mm long, rusty tomentose; outer petals ovate, acute, 1.2 cm long, rusty tomentose outside, glabrous inside; inner petals ovate, 0.8 cm long; stamen C. 85, 1.5 - 1.7 mm long, apical prolongation narrow; carpel c. 25, elongated, 2 mm long, tomentose; stigma axe-shape, not hairy. Carpidia not seen.

Distribution: Borneo.

Habitat & Ecology: Dipterocarp forest, c. 30 m alt.

Field note: Leaves are glaucous below. Flower, bud is brownish-green.

Specimen examined: BORNEO: West Kalimantan, Gn Palung Nature Reserve, v *Balgooy* & v *Setten* 5559.

Note: This species is easily recognized by its obcordate of leaf, emarginate apex of leaf solitary flower and ramuliflorous flower

Figure 2. *Fissistigma cordifolia* Irawan, sp.nov.- a. Branch, b. Outer petal, c. Inner petal, d. Sepal, e. Stamen, f. Carpel, 1. outside view, 2. inside view [a-f: v Balgooy & v Setten 5559]

3. *Fissistigma elmeri* Merr.

Fissistigma elmeri Merr., U. Calif. Publ. Bot. 15 (1929) 72. -- Type: Borneo, Tawao, Elphinstone Province, *Elmer 20881*(iso BO!, L! in digital image)

Climber c. 5 m tall, young twigs sparsely whitish-brown. pubescent, afterward glabrous, black. Leaves: petiole 0.7 cm long, 3 mm diameter, tawny pubescent; lamina subcoriaceous, oblong or obovate, 10.5 - 14.5 cm long, 4 - 8 wide; base rounded; apex acuminate, sometimes emarginate; glabrous above; sparsely whitish-brown pubescent beneath; lateral nerves 14 - 16 pairs, anastomosing. Inflorescence paniculate, axillary. Flower bud elongated conical, tawny pubescent. Flower: pedicel 1 - 2.5 cm with a median triangular bracteole, 2 mm long; sepal triangularis, 2 mm long; outer petallanceolate, acuminate, 1.5 - 2.5 cm long, 0.5 cm wide, tawny pubescent outside, glabrous inside; inner petal lanceolate, 1 - 1.5 cm long; stamen 1.2 mm long, apical prolongation narrow; carpel c. 12, elongated, tomentose; stigma clavate, not hairy. Carpoidia not seen. Distributions: Borneo and Sumatra Habitat & Ecology: This species found in primary forest recently under local destruction or secondary forest along logging road, at 350 - 600 m.

Habitat & Ecology: disturbed in primary forest, on deep clayey soil derived from granite terrain sloping, at 650 m.

Field note: solitary climber, flowers bud is ochrish brown.

Vernacular name: wili ula (Kolawi Lang).

Specimen examined: CELEBES: Central Sulawesi, Supu valley, c. 60 km SSE of Palu, *Vogel 5627*.

4. *Fissistigma fulgens* (Hook. f. & Thomson) Merr.

Melodorum fulgens Hook. f & Thomson, Fl. Ind. 1 (1855) 120 et in Fl. Br.India. 1 (1872) 82; Miq., Fl. Ind. Bat. 1 (1858)35; King, Ann. Roy. Bot. Gard. (Calcutta) 4 (1893) 142; Ridl., Sarawak Mus. 1. 1 (1913) 90; Ridl. Fl. Malay. Penins. 1 (1922) 83. – *Fissistigma fulgens* (Hook. f. & Thomson) Merr., Philipp. J. Sci. 15 (1919) 131; J Sinclair, Gard. Bull. Str. Settl. 14 (1955) 353.-- Type: Malay Peninsula, Malacca, *Griffith s.n.* (holo K, not seen).

Uvaria fulgens Wall. Cat. 6482, Merr., Philipp. J. Sci. 15 (1919) 131; J Sinclair, Gard. Bull. Str. Settl. 14 (1955) 353, *nomen nudum*.

Myristica finlaysoniana Wall. Cat. 6793, Merr., Philipp. J. Sci. 15 (1919) 131; J Sinclair, Gard. Bull. Str. Settl. 14 (1955) 353, *nomen nudum*

Climber, c. 20 m tall, 6 cm girth, young twigs tawny pubescent, afterward glabrous with numerous lenticels, dark coloured. Leaves: petiole 0.6 - 1.5 cm long, 0.1 - 0.2 cm diameter, tomentose; lamina chartaceous, ellips, 6 - 15 - (18.5) cm long, 2.5 - 8.5 cm wide; base rounded; apex acuminate; glabrous above except the midrib; tawny puberulous, adpressed, shining beneath; lateral nerve 6 - 14 pairs, not anastomosing. Inflorescence cymous, few-flowered (3-flowered), terminal or leaf-opposed. Flower bud conical, 1 cm long, pubescent, shining. Flower: pedicels 1 - 1.5 cm long, tawny

pubescent, with two ovate bracteoles, one basal and the other one median, 2 mm long, tawny pubescent, shining; sepal ovate, 3 mm long, covered tawny pubescent and shining; outer petals ovate, 1-1.5 cm long, 0.6-0.7 wide, densely pubescent and shining outside, glabrous inside; inner petals ovate, 0.7-1.2 cm long; stamen numerous, 2 mm long, apical prolongation narrow; carpel c.6 - 7, elongated, 3 mm long, tawny pubescent and shining; stigma somewhat split, axe-shape, not hairy. Monocarpidia globose, ovoid to ellipsoid, like beak of the apex, 1.5 - 3 cm long, 0.6 - 2 cm diameter, often tawny pubescent, shining; stalks I - 2.5 cm. Seed several in two rows, oval, 1 cm long, 0.5 cm wide; surface smooth, dark brown coloured.

Distributions: Sumatra, Malay Peninsula and Borneo.

Habitat & Ecology: The species occurs in forest edge, sandy land, hill, edge of the river and plain in secondary forest, at 50 -100 m alt.

Field note: Flowers are yellow lighted. Fruit is light orange yellow.

Vernacular name: Akar larak, akar salah hutan, akar sengolok, akar pisang pisang (Malay.), Pisang-pisang, kupah, akar kunod, akar malam (Saraw.), Sigubing, sagombong andu, pitudong, tuya bini (Brun.).

Uses: Burkill & Haniffin Burkill (1935b) recorded that the decoction of leave is given after childbirth as a protective medicine. The poultice of leaf, is applied to ulcers and sore on the legs.

Note: This species is easily recognized by its indumentum, especially on the lower surface of leaves, flowers and often in carpidia.

Specimens examined: SUMATRA: Riau, Tjenako, *Epolak 623*; North Sumatra, *Lörzing 13624*; Bangka, *Teysman 357*; Blitoeng, Mangan, *Teysman 11005*. MALAY PENINSULA: Perak, Taiping, *Haniff & Nur 2317*; Perak, Kati Kuala Kangsar, *Haniff SFN 14965*; Kedah, Koh May Forest Reserve, *Kiah SFN 35205*; Perak, Larut, *King 4583, 5453*; Singapore, Pahang, Near Methodist Mission Bungalow Fraser's Hill, *Thomas P.4304*. BORNEO: British North Borneo, Kumanis, *Abdul Rahim A 493*; Sabah, Sandakan, Bukit Tangkurang, *Abdul Rahim s.n.*; Sarawak, Bintulu, Bantar Orang, *Brunig S 11999*; Sarawak, Kuching, *Elias Daie 8464*; B.N. Borneo, Kilugos, *Goklin 2544*; Soeka Lanting, *Hallier 145, 202*; E. Kalimantan, Lempone Tanah Merah, Kuswata Kartawinata I *416, I 234*; Kalimantan Barat, Ketapang, Gn. Palung Nature Reserve, Laman et all *TL951*; Sabah, *Mail 7754*; Sandakan, *Merrill 20318*; Sepilok Kopis, B Siseron *SAN 27117*; Kalimantan Timur, Kutai, Jempang, *Susiarti & Hidayat SSS 99089*; B.N. Borneo, Benoni, *Tandom 2955*; B.N. Borneo, Kumanis, *Tandom 3317*; Sandak Ngabang, *Teysman 362 A, 362 B*; Central Kalimantan, Palangkaraya, tangkiking, *Tukirin Partomihardjo 647*.

5. *Fissistigma hypoglaucum* (Miq.) Merr.

Melodorum hypoglaucum Miq., Ann. Mus. Bot. Ludgo-Bat. 2 (1865) 36; King, Ann. Roy. Bot. Gard. (Calcutta). 4(1893) 136; Ridley, Fl. Malay. Penins.l (1922) 86. -- *Fissistigma hypoglaucum* (Miq.) Merr., Philipp. J. Sci. 15 (1919) 132; J Sinclair, Gard. Bull. Str. Sett.l. 14 (1955) 352. -- Type: Malay Peninsula, Perak, Larut, *King 5060* (hololecto BO!, isolecto K, not seen).

Climber, c. 15 - 18 m tall, young twigs rusty tomentose, afterward glabrous with numerous lenticels, brown. Leaves: petiole 0.5 - 1.2 cm long, 1.5 mm diameter, rusty pubescent; lamina sub coriaceous, ellips to oblong, 8 - 16 cm long, 3 - 5 cm wide; base

rounded, slightly acute; apex acute to acuminate; glabrous above; puberulous, glaucous beneath; lateral nerves 9 - 14 pairs, not anastomosing. Inflorescence paniculate, terminal or axillary. Flower bud elongated conical, rusty tomentose. Flower: pedicel 1 - 1.5 cm long with 2 bracteoles (1.5 mm long), one basal and the others one median; sepal ovate, acute, 2 mm long, rusty pubescent outside; outer petals linear-lanceolate, acuminate, 2 cm long, 0.4 cm wide, rusty tomentose outside, glabrous inside with black spot at the base; inner petal lacking. Stamen 1.5 mm long, apical prolongation revolute; carpel c. 7, curved, 2 mm long, pubescent; stigma clavate, not hairy. Carpida not seen.

Distributions: Sumatra, Malay Peninsula and Borneo.

Habitat & Ecology: This species is found in hilly forest, at 50 -150 malt.

Field note: Leave is risk green. Fruit is dark green with yellow tinge. Bark is dark brownish. Flowers are yellowish brown.

Vernacular name: Akar Larak Merah (Malay.)

Specimen Examined: SUMATRA: Unknown location, *Leg. Ign.s.n.* MALAY

PENINSULA: Perak, Larut, *King 5060*. BORNEO: B.N. Borneo, Mt. Kinabalu,

Penibukan, *Clemens s.n.*; Bukit Raya, Batu Badingin, *Veldkamp 8274*.

6. *Fissistigma kinabaluense* (Stafleu) Merr.

Melodorum kinabaluense Stafleu, Trans. Linn.Soc. Bot. 4 (1894)13.0; Ridl., Sarawak Mus. J. 1(1913) 90. -- *Fissistigma kinabaluense* (Stafleu) Merr., Philipp. J. Sci. 14 (1919) 132. -- Type: Borneo, Mt. Kinabalu, at Penokok, *Haviland 1310* (holo K, not seen).

Young twigs tawny tomentose, shining, afterward glabrous, dark coloured. Leaves: petiole tawny tomentose, 0.5 - 1 cm long, 1 - 2 mm diameter; lamina chartaceous, ellips to oblong, S - 12 cm long, 3 - 4 cm wide; base rounded; apex acuminate; glabrous above; tawny pubescent beneath; lateral nerves 17 - 20 pairs, not anastomosing. Inflorescence solitary, axillary. Flower bud conical, rusty tomentose. Flower: pedicel slender, S cm long with a small sub median bracteole (2 mm long); sepal ovate, acute, 3 mm long, tawny tomentose, veins prominent; outer petal broadly ovate, acute, 1 - 2 cm long, 0.8 cm wide, sparsely tawny tomentose outside, glabrous inside, veint prominent; inner petal 0.7 cm long, lacking when the outer blossom; stamen 1.5 mm long, apical prolongation revolute; carpel 14, curved, 1.5-2 mm long, densely tawny tomentose; stigma clavate, not hairy. Carpida not seen.

Distribution: Borneo

Habitat & Ecology: This species is found in Plain, at 3000 ft alt.

Vernacular name: Tutuyud (Dusun)

Note: This species is easily recognized by the broadly ovate petal, prominent petal-vein and solitary flower.

Specimens Examined: BORNEO: B.N. Borneo, Dallas, Mt. Kinabalu et Penokok, *Clemens 26407, 26811, 30367, 30368*; B. N. Borneo, Tambatu, Tambunan, *Puasa Angian s.n.*

7. *Fissistigma kingii* (Boerl.) Burkill

Melodorum kingii Boerl., Icon. Bogor. 1 (1899) 134; Ridl., Fl. Malay. Penins. 1 (1922) 82. -- *Melodorum parviflorum* non Scheff., sensu King, Ann. Roy. Bot. Gard.

(Calcutta) 4 (1893)137. -- *Fissistigma kingii* (Boerl.) Burkill, Bull. Misc. Inform. (1935) 317; Burkill, Diet. Prod. Mal. Penins. 1 (1935) 1021; Airyshaw, Bull. Misc. Inform (1939) 287; Sinclair, Gard. Bull.Str.Settl. 14 (1955) 358; Kessler & Heusden, Rhedea 3 (1) (1993) 63. -- Type: Perak, Larut, *King 4070* (hololecto BO!, isolekto K, L, not seen).

Melodorum paniculatum Ridl., Kew Bull. (1912) 386; Ridl., Sarawak Mus. J. 1 (1913) 90. -- *Fissistigma paniculatum* (Ridl.) Merr., Philipp. J. Sci. 15 (1919)134. -- Type: Borneo, Kuching, *Haviland 1845* (holo K, not seen); *syn.nov.*

Climber up to 12 m tall, young twigs rusty tomentose, afterward glabrous with numerous lenticels, dark coloured. Leaves: petiole 1- 1.5 cm long, 2 - 3 mm diameter, rusty tomentose; lamina subcoriaceous, ellips to oblong, 7 - 20 cm long, 3 - 8 cm wide; base rounded; apex acute; velutinous to glabrous above except tomentose midrib; rusty velutinous beneath; lateral nerves 13 -17 pairs, anastomosing. Inflorescence paniculate or cymous, terminal-axillary. Flower bud conical, rusty tomentose. Flower: pedicels 0.5 - 2.5 cm with a triangular bracteole, basal or median; sepals triangular, acute, 2 mm long, rusty tomentose; outer petals ovate, 1 - 1.3 cm long, 0.5- 0.7 cm wide, rusty tomentose outside, glabrous inside; inner petals slightly smaller, 0.7 cm long; stamen 1-2 mm long, apical prolongation revolute; carpel few (8-15), 2-3 mm long, curved, tomentose; stigma clavate, not hairy. Monocarpidia globose, 2 - 2.5 cm diameter, glabrous.

Distributions: Sumatra, Malay Peninsula, Borneo, and Celebes.

Habitat & Ecology: Primary forest recently under local destruction, secondary forest along logging road, river gorge, yellow loam soil, sand stone derived soil and gentle slope, at 50 - 500 m alt.

Field note: Leaf is very glossy bright green, slightly brown underneath. Flowers are white tinged with pink, brown outside.

Vernacular name: poko achar, akar larak merah (Malay.), akar tupong (Tawao).

Uses: Decoction of flowers was given for stomach disorder or dyspepsia.

Notes:

1. Airy-shaw (1939) described several varieties found in Malay Peninsula. They are var. *multinerve* Airy-Shaw, var.*grandiflorum* Airy-Shaw, var.*tomentosum* Airy-shaw and var.*fagifolium* Airy-Shaw. No specimens available for examination.
2. According to Ridley (1913), *M.paniculatum* is near to *M.litseaefolium*. However they differ in the shape of leaf, texture of leaf; and shape of stigma. It is similar to *F. kingii* in characters of leaves and flower.

Specimens examined: MALAY PENINSULA: Pahang, Tambeling, *Handerson SFN 21802*; E. Johore, Sungei Kayu, *Kiah SFN 32197*; Perak, Larut, *King 4070*. BORNEO: W. Koetai, *Enderst 2423, 3299*; Sarawak, Ulu segoR, Bintulu, *Illias Paie S. 27247*; Bukit Riang, Haring di Bawah, *Jaheri 1240*; B. N. Borneo, Tawao, St. Lucia F.D, *Kadir A. 2073*; E. Kalimantan, road Balikpapan Samarinda, km IS road to Sungai Wain, *Kessler et all PK 1063*; B.N. Borneo, Island Nunukan, *Kostermans 8788*; E. Samarinda, Alluvial along Loa Haur W of Samarinda, *Kostermans 10594*; E. Borneo, Nunukan, Near of Tarakan, *Meijer 2235*; Sarawak, Kenaya F.R, Ulu lawas, *Paul Chai & Illias Paie S 31543*; E. Kalimantan, Kayan Mentarang National Park, *Sidiyasa & Arifin Z 1602*; Sarawak, Ulu segoR, Bukit Bugoh, Lawar District, *Wright S. 25265*. CELEBES: S. Sulawesi between Soroako & Nickel Plant Site, *Balgooy 3940*.

8. *Fissistigma lanuginosum* (Hook. f & Thomson) Merr.

Melodorum lanuginosum Hook f & Thomson, Fl. Ind. I (1855) 117 et in Fl. Br. India I (1872)79; Miq., Fl. Ind. Bat. I (1858) 35; King, Ann. Roy. Gard. (Calcutta) 4 (1893) 138; Ridl., Fl. Malay. Penins. 1(1922) 86. -- *Fissistigma lanuginosum* (Hookf&Thomson.) Merr., Philipp. J. Sci. IS (1919) 132; J Sinclair, Gard. Bull. Str. Settl. 14 (1955) 357. -- Type: Penang, Porter, Wall. Cat. 6454 (holo K, not seen).

Uvaria tomentosa Wall. Cat. 6454, Merr., Philipp. J. Sci. IS (1919) 132; J Sinclair, Gard. Bull. Str. Settl. 14 (1955) 357, *nomen nudum*

Young twigs rusty tomentose, afterward glabrous with numerous lenticels. Leaves: petiole rusty tomentose, 1- 1.5 cm long; lamina coriaceous, ellips to oblong, 8 - 17 cm long, 4 - 6 cm wide; base rounded; apex acuminate; glabrous to glabrescent above, shining; lanuginose beneath; lateral nerves 12 - 21 pairs, anastomosing. Inflorescence cymous, terminal. Flowers bud conical, 1.5 cm long, densely rusty tomentose. Flower: pedicels 1 cm long with 2 ovate bracteole, tomentose; sepals coriaceous, 0.6 cm long, rusty tomentose; outer petals, ovate, 2- 2.5 cm long, 1 cm wide, densely.rusty tomentose outside, glabrous inside; inner slightly smaller, 1.8 - 2 cm long, glabrous in both surface; stamen 1.5 mm long, apical prolongation revolute; carpel 25, curved, rusty tomentose; stigma acute, not hairy. Monocarpidia globose, 1.5 - 2.5 cm diameter, rusty tomentose; stalk very short, slightly sub sessile, 0.5 cm long.

Distribution: Malay Peninsula.

Habitat & Ecology: This species occurs in disturbed forest at low alt.

Field note: The leaf is rich glossy with a darkish green tinged with brown of underneath.

Fruit covered with a soft light brown gluff, in large clustered. Vernacular name: Larak api, selugoh semang (Malay.).

Uses: A decoction of the root is given after childbirth and perhaps for stomachache.

Specimens Examined: MALAY PENINSULA: E. Johore, Sungei Kayu, *Kiah* 32199; Perak, Larut, *King* 4985; Unknown location, *Kunsler* 118; Singapore, South of Side of Mac Ritchie Reservoir, *Sinclair* 8923.

9. *Fissistigma latifolium* (Dunal) Merr.

Unona latifolia Dunal, Monog. Anon.(1817)115. - *Uvaria latifolia* Bl., Fl. Jav. Anon. (1830) 37. --*Melodorum latifolium* Hook.f. & Thomson, Fl. Ind. 1(1855) 117 et in Fl. Br. India 1(1872) 79; Miq., Fl. Ind. Bat. 1(1858) 35; King, Ann. Bot. Gard. (Calcutta) 4 (1894)135. - *Fissistigma latifolium* (Dunal) Merr., Philipp. J. Sci. 15 (1919) 132; Ridl., Pl. Malay. Penins. 1(1922) 85; J Sinclair, Gard. Bull. SIT. Settl. 14 (1955) 359; Backer & Bakh. f, Fl. Jav. 1(1963) 114; Kessler & Heusden, Rhedea 3 (I) (1993) 64. -- Type: Perak, Kinta, *King* 7053 (Holo K, not seen).

Anona rufa C.Presl., ReI. Haenk. 2 (1830) 75. - *Melodorum rufum* Merr., Philipp. 1. Sci. 3 (1908) 223. -*Fissistigma rufum* (C.Presl) Merr., Philipp. J. Sci.15 (1919) 136; Merr., Enum. Philipp. Pl. 2 (1923) 174. -- Type: Luzon Island, Irobin, Mt Bulusan, Provo of Sorgos on, *Elmer* 16709 (hololecto BO!); *syn.nov.*

Unona sphaerocarpa Blume, Fl. Jav. Anon. (1828) 39, t. 16. -- *Melodorum*

sphaerocarpum (Blume) Miq., Fl. Ind. Bat. I (1858) 35; King, Ann. Roy. Bot. Gard. (Calcutta) 4 (1893) 137. -- *Fissistigma sphaerocarpum* (Blume) Merr., Philipp. J. Sci 15 (1919) 136; Backer, Blumea 5 (1945) 493; Backer & Bakh.f., Fl. Jav. 1(1963) II5. -- Type: Java, aan den Salak, *Blume S.n.* (holo BO!); *syn.nov.*

Melodorum mollissimum Miq., Fl. Ind. Bat. Sup I. (1861) 374. -- Type: Sumatra australis, in Provo Lampoeng prope Natar, *Teysman S.n.* (Holo L!, in digital image).

Melodorum parviflorum Scheff., Nat. Tijds. Neder. Ind. 31 (1870) 344; Boer!, Icon. Bogor. I (1899) 133. -- *Melodorum parviflorum* var. *angustifolia* Boed., Icon. Bogor. I (1899) 134. -- *Fissistigma parviflorum* (Scheff.) Merr., Philipp. J. Sci. 15 (1919) 135. -- Type: Bangka, prope Blienjoe, *Teysman s.n.* (holo BO!); *syn.nov.*

Climber up to 30 m tall, 4 - 15 cm girth, young twigs rusty tomentose, afterward glabrous with numerous lenticels, dark brown to blackish. Leaves: petiole (0.5) 1- (1.7) cm long, 2 mm diameter, tomentose; lamina chartaceous to coriaceous; ellips to oblong II-15 - (24) cm long, 5 - 7 - (II) cm wide; base rounded, sometime cuneate; apex slightly acute to acute, sometime retuse; pubescent above, sometimes glabrescent; tawny tomentose beneath; lateral nerves (12)-15- 23 pairs, anastomosing. Inflorescence cymous, terminal, axillary or leaf-opposed. Flowers bud conical, tawny tomentose. Flower: pedicel I - 2 cm long with a median or basal bracteole, ovate, 2 - 3 mm long; sepal ovate to broadly ovate with acute apex, 2 - 3 mm long; tomentose outside, glabrous inside; outer petals ovate to broadly ovate, I - 2.5 cm long, tomentose outside, glabrous inside; inner petals slightly smaller, 0.9 - 1.3 cm long, glabrous in both surface; stamen 1.5 - 2 mm long, apical prolongation revolute; carpel 6 - II, curved, 3 mm long, tomentose; stigma clavate, not hairy, somewhat split. Monocarpidia 5 - 8; ovoid, globose or subglobose, sometime the apex with shortly apiculate; 1.5 - 4 cm long, 1.5 - 3 in diameter, tomentose; stalk 3 cm long. Seed c. 4 - 6 oval, 1.3 cm long, smooth, shining, dark brown coloured.

KEY TO THE VARIETY

- a. Leaf chartaceous to subcoriaceous; monocarpidia globose or sub globose; position of bracteole medianvar. *latifolium*
- b. Leaf coriaceous; monocarpidia ovoid; position of bracteole basal var. *ovoideum*

a. var. *latifolium*

Leaves chartaceous to subcoriaceous; ellips to oblong 11-15- (24) cm long, 5 - 7 - (11) cm wide; lateral nerves (12)-15 - 23 pairs. Pedicel 1 -2 cm long with a median bracteole, ovate, 2 - 3 mm long. Stamen 2 mm long. Carpel 6 - II, curved, 3 mm long, tomentose. Monocarpidia globose or sub globose, sometime the apex with shortly apiculate; 1.5 - 2.5 in diameter, tomentose; stalk 3 cm long.

Distributions: Sumatra, Malay peninsula, Borneo, Java, Celebes, Philippines and Mollucas.

Habitat and Ecology: This species occurs in peat swamp forest, sandy loam soil, sand and limestone, secondary forest, riverine forest and submountain tropical forest, at 90 - 1200 m alt.

Field note: Flowers brown, grayish outer, dull yellow inner. Flowers are very sweet

fragrant. Fruit green.

Vernacular name: ki ladja, areuy ki ladja, aroi ki tjantoeng (Sund.), merangan, londo lojot (Jav.), akar pisang-pisang beledu (Malay.).

Uses: Burkill (1935b) record that the juice offruit is medicinal.

Specimens Examined: SUMATRA: West Sumatra, Harau, Sarasah Bonta, *Hotta & Okada* 1597; Bangka, *Teysman* S.n.; Riau, Tandjung Pinang, *Teysman* 17995; Sumatra australis, in Lampoeng prope natar (L, in digital image), *Teysman* S.n.; Asahan, *Yates* 1749; MALAY PENINSULA: Perak, *King* 4002, 7796. BORNEO: Brunei, Berakas, *Ashton S.* 7835; Sarawak, Tanjung Keranji, Meludak Per, *Anderson* 13262; Sarawak, G. Mulu path from Sg. Melinau Paku, *Anderson* S.n.; Sarawak, *Clemens* 20150; Mt. Kinabalu, Dallas, *Clemens* 27439; Tenompok, Kinabalu, *Clemens* 28127, 28328; Mt. Kinabalu, Penaturan Basin, *Clemens* 32448, 34419; Mt. Kinabalu, Columben River, *Clemens* 33978; Tawao, Elphinstone Province, *Elmer* 20516, 20814, 21300; Central East Borneo, W. Koetai, *Endert* 2423, 5035; Suo Kenepai, *Hallier* 1995; Sarawak, Kuching, *Haviland & Hose* 869; Dallas, Koug, *Hottum* 25128; Sarawak, Bt Gaharu, Serian, *Illias Paie & Ashton* 8 16666; Sarawak, Kenaya, Ulu Lawas, *Illias Paie & Ashton* 831543; Base Camp Project Barito Ulu & Environs Joloi River, *Kade Sidyasa PBU* 513; E. Kutai, Sangkulirang Sub Div., Sg. Susuk Region, *Kosterman* 5710; Island Nunukan, *Kosterman* 8788; Berouw, Mt lias Bungaran, *Kosterman* 13905; Sarawak, Ulu Mamut, Bakong, Miri, *Sibat ak Luang* 824371; East kalimantan, Coal KPC, Sangatta, *PK 1200*. JAVA: Preanger, Bandjar *Backer* 4236; Preanger, Kali Poetjang, *Backer* 4429; Preanger, Tjikemboelan, *Backer* 4495; Bantam, Pasaoeran aan Straat Soenda, *Backer* 7189; Batavia, Tusshen Djasinga en Pasir Madang, *Backer* 10262; WZW van Buitenzorg, Nirmala, *Backer* 11025; Banjoemas, Tunsshen Madjenang en Tjisalak, *Backer* 18484; Djampang Kulon, Tjiganitri, Tjiemmas, *Backer* 25558; Batavia, Depok, *Backer* 26305, 26320; Preanger, Tjadas Malang, Tjidadap, Tjibeber, *Bakhuizen v/d Brink* 2256; Preanger, Gn. Besar, Tjidadap, Tjibeber *Bakhuizen v/d Brink* 2423; Batavia, *Bakhuizen v/d Brink* 3100; Batavia, Depok, *Beumee A* 157, 687, 5642, 6482; Pekalongan, Soebah, *Beumee* 4209; aan den salak, *Blume s.n.*; Batavia, Depok, *Burch et de Monckey, S.n.*; Batavia, Depok, *Hallier S.n.*; Batavia, Depok, *Hilderbrad* 15; Djampang Wet an, Takoko, *Koorders* 14937 B, 33347; Unknown location, *Koorders* 20879 B; Bezoeki, *Koorders* 21633B; Pekalongan, *Koorders* 22535 B, 27288B; Malang, Pasoeroean, *Koorders* 23795 B; Preanger, Garut, Pangentjongan, *Koorders* 26690; Gn. Kantjana, *Koorders* 41608 B; Batavia, Depok, *Koorders* 41725 B; 42574 B; Bazoeki, Sriwulung, *Koorders* 43043 B; Preanger, Tasikmalaya, Pandjalu *Koorders* 47606 B; Bogor, Depok, *Soengandiredja* 330; Gunung Halimun, *Uchida* 41; Tapos, Pondok Gede, *Van Steenis* 2446; Preanger, Gn Besar, Tjidadap, Tjibeber, *Winckel* 321 B, 330B, 339 B; Bogor, *Leg.ign. S.n.*; Bogor, *Leg. Ign.* 148 C; Bogor, *leg.ign.* 186; ; Mt Salak Frape Tjigompong, *Leg .ign. S.n.* MOLLUCAS : Seram, East of Masohi, *Burley et all* 4356. PHILIPPINES: Mindanou, Camp Keitley, Lake Larao, *Clemens* 356; Luzon Island, Irobin, Mt. Bulusan, Prov.of Sorgoson, *Elmer* 16709; Island of Minadanou, Todaya (Mt. Apu), District of Davao, *Elmer* 10693; Luzon, Prov.of Laguna, *Ramos* 13527; Luzon, Anuling Zambalas, *Ramos & Edano* 44694.

b. var. *ovoideum* (King) J Sinclair

Melodorum latifolium var. *ovoideum* King, J. Asiat. Soc. Bengal. 61 (1892) 102 et

in Ann. Roy. Bot. Gard. (Calcutta) 4 (1893) 135. -- *Fissistigma latifolium* var. *ovoideum* (King) J Sinclair, Gard. Bull. Str. Settl. 14 (1955) 359. -- Type: Malay Peninsula, Malacca, *Griffith S.n.* (holo K, not seen).

Fissistigma ovoideum (King) Merr., Philipp. J. Sci. 15 (1919) 134. -- Type: Perak, Batang Padang Distric, *King* 8119 (holo BO!).

Leaves coriaceous, oblong 12 -15 cm long, 4-4 cm wide; lateral nerves 11 pairs, anastomosing. Pedicel 1 cm long, bracteole 1, ovate, acute, basal, tawny tomentose. Stamen 1.5 mm long. Carpel few, c. 5; slightly curved, 3 mm long; densely tomentose hairs. Monocarpidia ovoid 4 cm long, 3 cm diameter, slightly apiculate; covered velvety hairs; stalk 2.5 cm long.

Distribution: Malay Peninsula.

Habitat & Ecology: This species occurs in edge of forest by roadside, in 300 -600 feet alt. Field note: Leave velvety deep green, soft dark brown underneath. Fruit velvety light rusty brown.

Vernacular name: Akar pisang-pisang bukit or buldo (Malay.)

Specimen Examined: MALAY PENINSULA: Pulau Penang, Highlands Hill, *Haniff* 9141; Perak, Batang Padang District, *King* 8119 ; Perak, *King* 10118; Malaya, Mac Ritchie Reservoir, Sriyakare, *Sinclair* 4922.

10. *Fissistigma litseaefolium* (King) Merr.

Melodorum litseaefolium King, J. As. Soc. Beng. 61 (1892) 103 et in Ann. Roy. Bot. Gard. (Calcutta) 4 (1893) 132; Ridl., Fl. Malay. Penins. 1 (1922) 83. -- *Fissistigma litseaefolium* (King) Merr., Philipp. 1. Sci. 15 (1919) 133; J Sinclair, Gard. Bull. Str. Settl. 14 (1955) 351. -- Type: Perak, *King* 4063 (holo L!, in digital image), *King* 4986 (para BO!).

Young twigs rusty tomentose, afterward glabrous with numerous lenticels. Leaves: petiole 0.7 - 1 cm long, 1 mm diameter, rusty tomentose; lamina chartaceous, ovate, 4 - 7 cm long, 2 - 3.5 cm long; base rounded; apex acute; glabrous above, grayish when dry; rusty tomentose beneath, somewhat like powder, glaucous; lateral nerve 9 - 10 pairs, not anastomosing. Inflorescence cymous or paniculate, terminal. Flower bud conical, rusty tomentose. Flower: pedicel rusty tomentose, 1 cm long, with a single small median bracteole; sepal ovate, acute, 2 mm long, rusty tomentose; outer petal, ovate, acute, 0.9 cm long, 0.4 cm wide, rusty tomentose outside; inner petal shorter than outer, 0.5 cm long, glabrous outside; stamen 0.5 cm long, apical prolongation revolute; carpel 20, curved, 1.5 - 2 mm long, rusty pubescent; stigma acute, not hairy. Carpidia not seen.

Distributions: Sumatra and Malay Peninsula.

Habitat & Ecology: This species is found in primary lowland forest, at 50 -125 m alt.

Field note: Flowers bud pale brownish-greenish or yellowish. Fruit is brownishgreenish.

Specimens Examined: SUMATRA: North Sumatra, Atjeh, Gn Leuser Nature Reserve, *de Wilde & de Wilde-Duyjjes* 18716; Riau, Indragiri, Bovenlanden, Moeara Pandjaki, *Buwalda* 6469. MALAY PENINSULA: Perak, *King* 4063 (L!, in digital image), *King* 4986.

11. *Fissistigma longipes* Merr.

Fissistigma longipes Merr., Pap. Michigan Acad. Sc. 24 (1939) 70. – Type: Sumatra, East coast Asahan, near haboko, *Rahmat* 8449 (holo L!, in digital image).

Climber up to 20 m tall, young twigs brown tomentose, afterward glabrous, dark brown. Leaves: petiole rusty tomentose, 1 cm long, 3 mm diameter; lamina sub coriaceous, ellips to oblong, 12 - 15 cm long, 5 - 7.5 cm wide; based rounded; apex rounded, sometime slightly retuse; glabrous above; rusty tomentose beneath; lateral nerves 13 - 20 pairs, not anastomosing. Inflorescence paniculate, terminal. Flowers bud elongated conical, rusty tomentose, recurved at the apex. Flower: pedicel 3 - 5 cm, with 1 median bracteole, ovate, 3 mm long; sepal ovate, 4 mm long, rusty tomentose; outer petals lanceolate, 2 - 2.5 cm long, 0.6 cm wide, rusty tomentose outside, glabrous inside; inner petal slightly smaller, 1.5 cm long; stamen 1.5 mm long, apical prolongation revolute; carpel 2 mm long, curved tomentose; stigma clavate, not hairy. Carpidia not seen.

Distributions: Sumatra and Borneo.

Habitat & Ecology: Mixed Dipterocarp forest, disturbed forest and red clay soil, at 120 m alt.

Field note: Bud flowers yellowish brown, rusty pubescent. Inner calyx pale yellow. Petals pale yellow, recurved at apex. Anther light yellow, style brown pilose hairs.

Vernacular name: andor si maloem (sum.)

Note: This species is easily recognized by long pedicel (up to 5 cm long).

Specimens Examined: SUMATRA: East Asahan, near haboko, *Rahmat* 8499 (L, in digital image); BORNEO: Central Kalimantan, Sintang HPH km 70, *Mahyar et all* 983.

12. *Fissistigma magnisepala* Irawan, sp.nov. (Fig.3)

Frutex scandens circiter 15 m. Ramunculus tawny tomentosa. Folia sub coriacea, oblonga, 10 - 14 cm longa, 4 - 5 cm lata; apice caudatis; basi rotundatis; sup erne glabrescent, subtus tawny tomentose, glaucous; nervis 10 jugis, subtus prominulis. Inflorescentia solitary, ramulifloris. Pedicelle brevis, subsessillis 0.4 cm longa. Bracteola 1, ovata, 0.5 cm longa, media. Sepala magni, ovata lata, 1.2 cm longa, 0.9 cm lata, coriacea, sparsim tomentose; venatio prominulis. Carpidia juvenia ovoid, 0.5 cm longa, 0.4 cm diametro, velutinous, glaucous. -- Typus: Borneo, East kalimantan, Maruwai, block Lampunut, Long Iram Sub District, 19 March 1999, *PK* 2621 (holo BO!, iso BO!)

Climber c. 15 m tall, young twigs tawny tomentose, afterward glabrous, black coloured. Leaves: petiole 0.6 cm long, 2 mm diameter; lamina subcoriaceous, oblong 10 - 14 cm long, 4 - 5 cm wide; base rounded; apex caudate; glabrescent above; tawny tomentose, glaucous beneath; lateral nerve 10 pairs, not anastomosing. Inflorescence solitary, ramuliflorus. Flowers bud not seen. Flower: pedicels very short, subsessille 0.4 cm long with a median bracteole, ovate, 3 mm long; sepal large, broadly ovate, 1.2 cm long, 0.9 cm wide, sparsely tomentose, venation prominent, persistent when fruiting; petal not seen; stamen not seen; carpel elongated, 2 mm long, tawny tomentose; stigma axe-shape, hairy. Young carpidia ovoid, 0.5 cm long, covered velutinous hair, glaucous.

Distribution: Borneo.

Habitat & Ecology: This species is found in primary dipterocarp forest with patches of

Kerangas (Perengat) forest, sometimes in water logged, at 310 malt. Field note: Leave is glaucous below. Sepal is large. Young Fruit is greenish glaucous.
Specimen Examined: BORNEO: East Kalimantan, Maruwai, Block Lampunut, Long Iram Sub District, PK 2621.

Figure 3. *Fissistigma magnisepala* Irawan, sp.nov. – a.branch, b. sepal, c.carpel, d.young carpidia, 1.outside view, 2. inside view [a – d: PK 2621]

13. *Fissistigma manubriatum* (Hook. f. & Thomson) Merr.

Melodorum manubriatum Hook. f. & Thomson, Fl. Ind. 1 (1855) 118 et in Fl. Br. India. 1 (1872) 79; Miq., Fl. Ind. Bat. 1 (1858) 35; King, Ann. Roy. Bot. Gard. (Calcutta) 4 (1893) 134; Boerl., Icon. Bogor. 1 (1899) 132; Ridl., Sarawak Mus. J. 1 (1913) 88; Ridl., Fl. Malay. Penins. 1 (1922) 84. -- *Fissistigma manubriatum* (Hook. f. & Thomson) Merr., Philipp. J. Sci. 15 (1919) 134; J Sinclair, Gard. Bull. Str. Settl. 14 (1955) 355; Kessler & Heusden, Rhedea 3 (1) (1993) 64. -- Type: Penang, Porter, Wall. Cat. 6465 (K, not seen).

Uvaria manubriata Wall. Cat. 6456, Merr., Philipp. J. Sci. 15 (1919) 134; J. Sinclair, Gard. Bull. Str. Settl. 14 (1955) 355, *nomen nudum*.

Melodorum bancanum Scheff., Nat. Tijds. Ned. Ind. 31 (1870) 244. -- Type: Bangka, Prope Muntok et Blienjo, *Cult. In Bot. Bog. XVIIE-IO7a* (holo BO!, iso BO!).
Melodorum khortalsii Miq., Ann. Mus. Bot. Ludg-Bat. 2 (1865) 37. -- Type: Borneo australis, in Martapoera, Poelo Lampei, In M. Pamatton, *Khortalls* S.n. (holo BO!).

Climber, up to 25 m tall, young twigs tawny tomentose, afterward glabrous with numerous lenticels. Leaves: petiole tawny tomentose, 1 - 1.5 cm long, 1.2 - 2 mm diameter; lamina sub coriaceous, oblong - lanceolate, 5 - 18 cm long, 2 - 7 cm wide; base rounded; apex acuminate; glabrous above, grayish when dry; densely sericeous beneath, adpressed, shining; lateral nerves 12 - 20 pairs, not anastomosing; reticulations not visible beneath. Inflorescence cymous, 3 flowered, terminal *or* leaf-opposed. Flowers bud conical, up to 2 cm long; densely sericeous. Flowers: pedicels 1 - 1.5 cm long, tawny tomentose; bracteole 2, one caducous basal, the other one median, 4 mm long, tawny tomentose; sepal ovate, 5 - 9 mm long, faintly three-nerved, tawny tomentose, persistent when *fruit* ripe; outer petals ovate, 2 - 2.5 cm long, 0.8 - 1 cm wide, densely sericeous outside, velutinous at the base inside; inner petals 1.5 cm long, 0.8 cm wide, sometimes falling when outer blossom; stamen 2 mm long, apical prolongation revolute; carpel c.30, curved, 3 mm long, covered with sericeous hairs; stigma axe-shape, not hairy, slightly split. Monocarpidia up to 15, ovoid, 1 - 2 cm diameter, velutinous; stalk 1.5 - 5 cm long, 2 - 3 mm diameter. Seed c. 9 in two rows, oval, 1 cm long, 0.8 cm wide; smooth, brown, shining.

Distributions: Sumatra, Malay Peninsula and Borneo.

Habitat & Ecology: This species is found in lowland to sub mountain (20 - 1100 m alt),

in rain forest, virgin forest, along primary forest, mixed dipterocarps, lowland forest, forest along small stream, secondary forest, granitic sand, sandy loam soil and flat land. Field notes: Leaf is middle green, glossy brown underneath. Flowers outside is light yellow-cinnamon *or* lilac pink. Lower stamen is bright red. Pistil! is yellow. Fruit is velvety light brown.

Vernacular name: akar larak, akar kenchon, akar jangkar, akar sembelit, akar pisang-pisang (Malay.), aka-aka (Minang), akar sengkayang boeboe, akar sengkayang, akar rarak api (Bangka).

Uses: Decoction of root is taken from stomachache (Burkill1935b).

Specimens Examined: SUMATRA: N. Sumatra, Gn Leuser N.R., de Wilde & de Wilde-Duyffes 16489; W. Sumatra, Payakumbuh, Gn. Bongso, *Dayar Arbain* DA 552; W. Sumatra, Payakumbuh, Kelok sembilan, *Hotta & Okada* 1661; Mt. Malintang, *Jacobs* 4641; Bangka, Lokok Besar, *Kosterman 1106*; Billiton, Tandjun Pandan, Komasi S.n.; Lampung, *Teysman* 2172; Riau, Tandjung Pinang, *Teysman* 17996, 17997, 17998; Bangka, Pangkal Pinang, *Teysman s.n.*; Bangka, Prope muntok et Blienjo, *cult. In Hor. Bot. Bog. XVII-107a* (holo BO!, iso BO!) XI A- 45; Bangka, Leg. ign. S.n. MALAY PENINSULA: Malacca, Kemendore, *Burkill14462*; Malacca, Jasin Road, *Burkill6432*; Johore, Sungei Rhu Reba, Jason Bay, *Corner* 28500; Perak, *King* 4385, 4744, 8352. BORNEO: E. Kalimantan, Wanariset area, Rintis Baru, *Ambri & Arifin W 705*; E. Kalimantan, Wanariset area, Rintis Soejawa, *Ambri & Arifin W 871, W 876*; E. Kalimantan, Wanariset, Samboja, *Balgooy 6091*; W. Koetai, *Endert 3904*; E. Kalimantan, road to Sungei Wain, *Kessler et all PK 1074*; E. Kalimantan, Inhutani area, Batu Ampar, *Kessler et all PK 1454*; E. Kalimantan, PT Kelian Equatorial Mining Area, *Kessler & Arbainsyah B 1384*; E. Kalimantan, PT Kelian Equatorial Mining Area, *Kessler et all PK 2099*; Borneo australis, *khortalls s.n.*; Balikpapan, Wain region, *Kostermans 4503a*; Tdg Bangko, near Mahakam, *Kostermans 7101*; E. Borneo, Sampit Region, near Kuala Kuajan, *Kostermans 7965*; Tawao, miles 9 pas road, *Krispinus s.n.*; E. Kalimantan, tanah Merah, *Kuswata Kartawinata I 417*; Kalimantan Tengah, Kota Waringin Lama, *Riswan et all B 22*; S. Kalimantan, Tabalong, *Sidiyasa & arifin 1988A*; E. Kalimantan, upper Mahakam River, *Sidiyasa and Ahmadi 1440*.

14. *Fissistigma rubiginosum* (AD C.) Merr.

Uvaria rubiginosa ADC., Mem. Soc. Genev. 5 (1832) 202. – *Melodorum rubiginosum* Hook. f & Thomson, Fl. Ind. 1 (1855) 116 et in Fl. Br. India I (1872) 79; King, Ann. Roy. Bot. Gard. (Calcutta) 4 (1893) 138; Ridl., Sarawak Mus. J. 1 (1913) 91; Ridl., Fl. Malay. Penins. 1 (1922) 88. -- *Fissistigma rubiginosum* (ADC.) Merr., Philipp. J. Sci. 15 (1919) 135; J Sinclair, Gard. Bull. Str. 14 (1955) 361. -- Type: circa Tavoy, Wall. Ex W. Gomez (holo G, not seen).

Uvaria nervosa Wall. Cat. 6474, Merr., Philipp. J. Sci. 15 (1919) 135; J Sinclair, Gard. Bull. Str. 14 (1955) 361, *nomen nudum*.

Uvaria fulvo Wall. Cat. 6427, Merr., Philipp. J. Sci. 15 (1919) 135; J Sinclair, Gard. Bull. Str. 14 (1955) 361, *nomen nudum*

Climber c. 10 m tall, young twigs tawny tomentose, afterward glabrous, dark coloured. Leaves: petiole tawny tomentose, 1.5 cm long, 0.5 mm diameter; lamina chartaceous, oblong, 19 – 25 cm long, 10 - 12 cm wide; base rounded; apex acute; glabrous

above except the midrib; tawny pubescent beneath; lateral nerves 12 - 14 pairs, prominent beneath; lateral nerve anastomosing. Inflorescence (cited from Sinclair 1955) cymous, 3 - 5 flowered, terminal, leaf opposed. Flowers bud elongated conical. Flower: pedicels brown pubescent, 2 cm long, with a minute basal and a sub median bracteoles; sepal broadly triangular, acute, 2 - 3 mm long, tomentose; outer petallanceolate-linear, 3.5 cm long when mature, brown tomentose outside, glabrous inside; inner slightly shorter than outer; stamen 2.5 mm long, apical prolongation narrow; carpel 3 mm long, pubescent; stigma clavate, not hairy. Carpidia not seen.

Distributions: Malay Peninsula and Borneo.

Habitat & Ecology: in lowland wood, at 15 - 30 malt.

Field note: Leaves is glossy dark green. Flowers are dark brown. Young fruit is dark green.

Specimen Examined: MALAY PENINSULA: Perak; *King* 5837.

15. *Fissistigma sumatrana* Irawan, sp. nov (Fig.4)

Ramunculus fulvo tomentosa. Petiola 1.2 cm longa, 2 mm diametro. Folia sub coriacea, obovata, 20 cm longa, 6.5 cm lata; basi cuneata; apice cuspidate; superne glabrosa excepta tomentosa midrib; subtus fulvo-pubescentibus. Multi nervus, 33 jugus, oblique, curve, subtus prominulis. Inflorescentia panicula, axillaris. Pedicelle 1.2 cm longa, fulvo-tomentosa. Bracteola I, parvi triangularis, media. Sepala ovata, 0.2 cm longa, fulvo-tomentosa. Petala exteriora lanceolata, 2 cm longa, 0.4 cm lata, fulvo-tomentosa. Stamina 1 mm longa. Carpela 2 mm longa, stigma clavata.--Typus: North Sumatra, Langkat, Bahorok, Batang Lawang, 2 March 1973, *Dransfield* 3401 (holo BO!, iso BO)

Young twigs tawny tomentose, afterward glabrous. Leaves: petiole 1.2 cm long, 2 mm diameter; lamina sub coriaceous, obovata, 20 cm long, 6.5 cm wide; base cuneate; apex cuspidate; glabrous above; whitish brown pubescent beneath; lateral nerves 33 pairs, not anastomosing. Inflorescence paniculate, axillary. Flower bud elongated conical. Flower: pedicels 1.2 cm long, tawny tomentose, with a small triangular median bracteola; sepal ovate, 2 mm long, tawny tomentose; outer petals lanceolate, 2 cm long, 0.4 cm wide, tawny tomentose outside, glabrous inside; inner petal, lanceolate, 1.2 - 1.3 long, glabrous in both surface; stamen 1 mm long, apical prolongation narrow; carpel c.5, elongated, 2 mm long, pubescent; stigma clavate, not hairy. Carpidia not seen.

Distribution: Sumatra

Habitat & Ecology: Secondary forest river side, in 150 malt.

Field note: Flowers at least white, extremely fragrant then turning orange brown. Young fruit is green.

Specimen Examined: SUMATRA: North Sumatra, Langkat, Bahorok, Batang lawang, *Dransfield* 3401.

Figure 4. *Fissistigma sumatra* Irawan, sp.nov.- a.branch, b. Outer petal, c. Inner petal, d. Sepal, e. Stamen, f. Carpel, 1. outside view, 2. inside view [a-f: *Dransfield 3401*]

INCOMPLETELY KNOWN SPECIES

There are several species recorded in literatures from Malesia which no specimen is available for examination. For description follows Miquel (1865) for *F.cinerascens* and *F. zippelii*; Ridley (1913) for *F.longipetalum* and *F.ovalifolium*.

1. *Fissistigma cinerascens* (Miq.) Merr.

Melodorum cinerascens Miq., Ann. Mus. Bot. Ludgo-Bat.2 (1865) 37. - *Fissistigma cinerascens* (Miq.) Merr., Philipp. J.Sci. 15 (1919) 131. -- Type: Sumatra Occidentalis, *Korthals S.n.*

Young twigs rusty tomentose. Leaves: petiole 0.4 - 0.8 cm long, rusty tomentose; lamina coriaceous, ellips to oblong, 5 - 12.5 cm long, 2.5 - 4 cm wide; base obtuse; apex shortly acute to acuminate; glabrous above, villosus beneath; lateral nerve 12 - 18 pairs, greyish. Inflorescence cyme, 1 - 3 flowered, axillary. Flower bud conical, 0.6 cm long, rusty tomentose. Flower: pedicel 1.25 - 2.5 cm long with one bracteole, rusty tomentose; sepal triangular-ovate; outer petals ovate, 0.6 cm long; inner petal smaller than outer; stamen numerous; carpel elongated. Monocarpidia subglobose to globose-ellipsoid, 1 - 1.4 cm diameter.

2. *Fissistigma longipetalum* (Ridl.) Merr.

Melodorum longipetalum Ridl., Sarawak Mus. 1. I (1913) 92.-- *Fissistigma longipetalum* (Miq.) Merr., Philipp. 1. Sci. 15 (1919) 133. -- Type: Borneo, Sarawak, Kuching, *Haviland 2102* (holo K, not seen)

Young twigs rusty tomentose. Leaves: petiole 1 cm long, scurfy only in adult leaves, rusty tomentose when young; lamina coriaceous, lanceolate, 6 - 7 cm long, 3 cm wide; base rounded; apex acute to acuminate; glabrous above; glaucescent beneath, shining hairs when young, except the tomentose midrib. Flower solitary, axillary; pedicel 2 cm long or less, with a small linear bracteole; sepallanceolate, acuminate, 3 mm long; outer petallinear-lanceolate, acuminate, thinly rusty tomentose outside, glabrous inside, 2.5 cm long, 0.4 cm wide; inner petals shorter, linear, half as long, galabrous; carpel elongated, covered with sericeous hairs.

3. *Fissistigma ovalifolium* (Ridl.) Merr.

Melodorum ovalifolium Ridl., Sarawak Mus. J. I (1913) 92.- *Fissistigma ovalifolium* (Ridl.) Merr., Philipp. J. Sci. IS (1919) 134. -- Type: Borneo, Sarawak, Kuching, *Haviland 3141,3151* (holo K, not seen).

Twigs tomentose. Leaves: petiole 0.4 cm long, pubescent; lamina coriaceous, ovate to ellips, 5 cm long, 2.5 cm wide; base broad, peltate, with two gland at the base;

apex shortly acuminate, blunt; glabrous above; glaucous beneath except the nerves covered with red hairs. Flower solitary, extra-axillary, opposed of leaves; pedicel slender, 2.5 cm long, with amminute bract; sepal ovate, obtuse, 2 mm long, red-hairs; outer petal linear, obtuse, 2.5 cm long, 0.4 cm wide, red hairs; inner petals very short, lanceolate, acuminate, 0.5 cm long, glabrous.

4. *Fissistigma zippelii* (Miq.) Merr.

Melodorum zippelii Miq., Ann. Mus. Bot. Ludgo-Bat.2 (1865) 38. -- *Fissistigma zippelii* (Miq.) Merr., Philipp.J.Sci. 15 (1919) 137. -- Type: Sumatra Occidentalis, *Korthals s.n.*

Twigs rusty tomentose. Leave: petiole 0.4 -0.6 cm long; lamina coriaceous, ellips to oblong, 10 cm long, 4 cm wide; base rounded; apex acute to acuminate; glabrous above; vellutinous beneath; lateral nerve 16 pairs. Inflorescence cyme, 3 - 5 flowered, axillary. Flower: pedicel elongated; outer petal 0.6 cm long; inner petal slightly smaller; stamen numerous; carpel hirsute.

EXCLUDED SPECIES

1. *Fissistigma clementis* Merr., Jour. As. Soc. Str. 85 (1922) 178. -- Type: Borneo, Sandakan, *Ramos* 1474 (holo BO!).

Note: This species has no scalariform leaf venation and its carpel is glabrous, In fact it is a synonym of *Mitrella kentii* (Bl.) Miq.

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Appendix 1. Distribution Map of new species of *Fissistigma*