B I O D I V E R S I T A S
Volume 9, Nomor 4
Halaman: 259-263

ISSN: 1412-033X
Oktober 2008
DOI: 10.13057/biodiv/d090404

The Indonesian Species of *Rennellia* Korth. (Rubiaceae)

SURATMAN♥
Biology Department, Faculty of Mathematics and Natural Science, Sebelas Maret University, Surakarta 57126.

Received: 14 July 2008. Accepted: 26 September 2008.

ABSTRACT

The objective of the research was to investigate the Indonesian species of *Rennellia* Korth. based on their morphological characters. The investigation on morphological characters was based on herbarium specimens at the Herbarium Bogoriense and Herbarium Andalas University. Additional specimens also were collected during the course of the field work. There are four species recognized, i.e., *Rennellia elliptica* Korth., *Rennellia elongata* (King & Gamble) Ridl., *Rennellia morindiformis* (Korth.) Ridl. and *Rennellia speciosa* (Wall. ex Kurz) Hook.f. An identification key to the species was produced and detailed description of the taxa was also provided. The natural history data including habitat, distribution, uses and vernacular names were also presented.

Key words: *Rennellia* Korth., Indonesia, morphological characters.

INTRODUCTION

Rennellia Korth. is a small genus native to South East Asia, with eight species recorded. *Rennellia* was firstly established by Korthals (1851) based on the name of an English oceanographer, J. Rennell (1742-1830). He recorded two species from Sumatra, namely as *R. elliptica* Korth. and *R. ovalis* Korth. At the same time he also proposed a new monotypic genus *Tribrachya* Korth. based on the type specimen collected by himself from Mount Singgalang, West Sumatra. This new taxon only consists of one species, *T. morindaeformis* Korth. Ridley (1939) then considered *T. morindaeformis* as a basionym for his new combination, *R. morindiformis* (Korth.) Ridl.

In 1869, Miquel stated that *Rennellia* and *Tribrachya* were similar with *Morinda* and placed them in the section *Sphaerophora,* as a part of the genus *Morinda.* Then, he removed *R. elliptica* as *M. sumatrana* Miq. and *T. morindaeformis* as *M. korthalsiana* Miq. Johansson (1989) rejected Miquel's opinion. He argued that material was collected by Korthals and also used by Miquel for his description of *M. sumatrana* lacked flowers and only had young unripe fruits so Miquel's species concept about this species is still questioned. Finally, Johansson stated that *M. sumatrana* is a synonym of *R. elliptica* and *M. korthalsiana* is a synonym of *R. morindiformis*.

In his account, Boerlage (1899) only recorded two species of *Rennellia* in Sumatra (*R. elliptica* and *R. ovalis*). Wong (1984, 1989) only treated *Rennellia* in the Malay Peninsula and recorded five species and two varieties of the genus, i.e. *R. paniculata* King & Gamble var. *paniculata*, *R. paniculata* King & Gamble var. *condensa* Wong, *R. microcephala* (Ridl.) Wong, *R. elongata* (King & Gamble) Ridl., *R. speciosa* Hook.f. and *Rennellia* sp. In Borneo (Kalimantan), Puff and Wong (1993) only recorded one species, *Rennellia elliptica*. Until now, the range of variation and distribution of the Indonesian species of *Rennellia* is not complete yet, therefore a study of the taxa for this region will seem a worthy subject of investigation.

MATERIALS AND METHODS

The research was conducted at the Herbarium Bogoriense (BO) and Herbarium Andalas University (ANDA) in September 2006 - April 2007. The study was based on herbarium specimens of the genus *Rennellia* in Indonesia. Additional specimens also were collected during the course of the field work. Some specimens from Malay Peninsula were also studied for comparison. All materials were examined based on their morphological characters and the terminologies of morphological characters followed Lawrence (1955), Veldkamp (1987), Stearn (1996) and Harris and Harris (1994). Information on the habitat, ecology, distribution, vernacular names, uses etc. were noted from the specimens label and literature.

RESULTS AND DISCUSSION

Rennellia Korth.

Rennellia Korth., Nederl. Kruidk. Arch. II. (1851) 255; Miq., Fl. Ned. Ind. II (1856) 248; Benth. & Hook.f, Gen. Pl. II (1873) 118; Hook.f., Fl. Brit. Ind. III (1880) 158; Boerl., Handl. Fl. Ned. Ind. II (1899) 94-95; Ridl., Fl. Malay. Penins. II (1923) 119; Pitard in Lecomte & Humbert, Fl. Gen. Indo-Chine III (1924) 426-427; Burkill, A Dictionary of the Economic Products of the Malay Peninsula (1935) 1888-1889; Corner, Ways. Trees Malay. I (1940) 558; Henderson, Malayan Wild Flow. (1959) 219-220; K.M. Wong, Gard. Bull. Sing. 37 (2) (1984) 193-198; K.M. Wong in Ng, Tree Fl. Malay. IV (1989) 404-405. Type species: *Rennellia elliptica* Korth.

Tribrachya Korth., Nederl. Kruidk. Arch. II. (1851) 254; Miq., Fl. Ned. Ind. II (1856) 247; Benth. & Hook.f, Gen. Pl. II

♥ **Alamat korespondensi:**
Jl. Ir Sutami 36A Surakarta 57126;
Tel.: +62-271-663375, Fax.: +62-271-663375.
e-mail: suratmanmipauns@yahoo.com

(1873) 118; Boerl., Handl. Fl. Ned. Ind. II (1899) 95. Type species: *Tribrachya morindaeformis* Korth.

Shrubs or small trees or trees, 1.5-10 m height. Trunk with divaricating branchlets, quadrangular to subterete, bark glabrous, glossy or not, grey to pale yellow-brown. Stipules interpetiolar, persistent, triangular to broadly triangular or ovate or suborbicular, short-connated or almost free, margin entire and glabrous, apex shortly bifid, glabrous, submembraneous or subchartaceous, veins distinct or not. Petioles subterete or subquadrangular, flattened or protruded, glabrous. Leaves decussate, simple; lamina oblong or broadly oblong to obovate or lanceolate or elliptic; base cuneate, margin entire, apex acute or acuminate to shortly cuspidate; glabrous on both sides, chartaceous to coriaceous when dry, pale yellow or dark yellow brownish or greyish brown on both sides when drying; penninerved, secondary veins 6-13 pairs, glabrous, curved, mostly alternate, anastomosed at margin, slightly to prominently raised below and flat to prominently raised above; midribs prominently raised below, flat to prominently raised above, glabrous; tertiary veins flat to prominently raised below, indistinct to moderately raised above; domatia absent in vein axils on both sides. Bracts persistent or not, narrowly triangular to broadly triangular or elliptic, margin entire, apex shortly bifid or acute or acuminate or obtuse, glabrous or slightly papillose, submembraneous or subchartaceous, veins indistinct. Inflorescence axis slender, subquadrangular or thin subquadrangular, glabrous; peduncle absent or present, slender, subterete or thin subquadrangular or subquadrangular, glabrous; pedicels always lacking. Inflorescences erect, terminal in origin; flowering heads arranged in a spike or spike-like or subraceme-like or raceme-like structure, each tier with 2-3 flowering heads, each head with (1-)2-3(-4) flowers. Flowers bisexual, homostylous or heterostylous; calyx tube subcampanulate or campanulate, truncate, glabrous on both sides; calyx lobes absent or present, very short or indistinct; corolla tube cylindric, glabrous; corolla lobes 4-5, thick, valvate, elliptic or elliptic-oblong or obovate to lanceolate or linear-lanceolate, margin entire and glabrous, apex obtuse or acute, glabrous; corolla throat glabrous; stamens 4-5(-6), inserted at corolla throat, alternated with corolla lobes, subsessile or sessile; anthers dorsifixed, lanceolate or linear-lanceolate, glabrous; filaments slender, thin, short, glabrous, exserted; stigma bifid, lobes ovate to elliptic or linear-lanceolate, glabrous; style slender, thin subterete, glabrous, ovary inferior. Fruits subglobose, ellipsoid or ovoid, glabrous, exocarp thin, mesocarp fleshy and thick, endocarp thin, locules 1-3. Stalks absent or present, subterete to subquadrangular, glabrous. Seeds ovoid or subglobose, glabrous, 1-2 per locule.

Key to the species of Rennellia in Indonesia

1. a. Flowering heads arranged in a spike-like to subraceme-like structure 2
   b. Flowering heads arranged in a raceme-like structure ..3
2. a. Heads never sessile; flowers homostylous .... 1. ***R. elliptica*** Korth.
   b. Heads sessile; flowers heterostylous..... ..... 2. ***R. elongata*** (King & Gamble) Ridl.
3. a. Flowers homostylous; anthers 1.1-1.5 mm long .... 3. ***R. morindiformis*** (Korth.) Ridl.
   b. Flowers heterostylous; anthers 2.25 - 4 mm long .... 4. ***R. speciosa*** (Wall. ex Kurz) Hook.f.

1. *Rennellia elliptica* Korth.

Rennellia elliptica Korth., Nederl. Kruidk. Arch. II. (1851) 257, Miq., Fl. Ned. Ind. II (1856) 248; Boerl., Handl. Fl. Ned. Ind. II (1899) 94-95. Type: Sumatra occidentalis, *Korthals* s.n. (Neotype L).

Morinda sumatrana Miq., Ann. Mus. Bot. Lugd. Bat. IV (1869) 213; Boerl., Handl. Fl. Ned. Ind. II (1899) 94-95; Johansson, Blumea 34 (1989) 7-9. Type: *Korthals* s.n. (Lectotype L; Isolectotype L, U).

Small tree or shrub, 1.5-2 m height. Branchlets when young quadrangular and becoming subquadrangular or quadrangular with age, bark glossy or not, pale yellow to brown coloured when dry; internodes 3-89 mm long, 1.5-5 mm wide, 0.5-5 mm thick. Stipules triangular or ovate or suborbicular, short-connated or almost free, apex short-bifid or obtuse or acute-acuminate or rounded, subchartaceous or submembraneous, veins distinct or not, 2-5 mm long, 2-6 mm wide. Petioles subterete or semi-terete or subquadrangular, flattened or protruded, 6-38 mm long, 0.75-2 mm wide. Lamina obovate or obovate-oblong or oblong or elliptic-oblong or oblong-lanceolate or lanceolate, 5.3-25.6 cm long, 1-8.2 cm wide, apex acuminate or short-cuspidate, chartaceous when dry, drying pale yellow or pale yellow brownish below, pale yellow or pale yellow greenish to brown or pale yellow brownish coloured above when dry; secondary veins 7-9(-10) pairs, slightly to prominently raised below, flat to moderately raised above; midribs flat to moderately raised above and prominently raised below; tertiary veins flat to slightly raised below and indistinct to slightly raised above. Bracts triangular or narrowly triangular or elliptic, apex short-bifid, acute or obtuse, glabrous, membraneous, 0.25-0.75 mm long, 0.1-1 mm wide. Inflorescence axis subquadrangular, 5-51 mm long, 1-2 mm wide, internodes 0.75-7 mm long; peduncles subterete or subquadrangular, (0.75-)1.5-2.5 mm long, 0.5-1.5 mm wide. Flowering heads arranged in a spike-like to subraceme-like structure, never sessile, in 2-12 tiers along the inflorescence axis, each head with 2-3 flowers, 1.5-3.5 mm long, 2-5 mm wide. Flowers homostylous, 2.5-6 mm long, 0.75-2.25 mm wide; calyx tube subcampanulate or campanulate, 0.75-2 mm long, 1-2.25 mm wide; corolla tube 1 mm long, 0.5-1 mm wide; corolla lobes 4-5, lanceolate or linear-lanceolate or oblong or elliptic, (1.75-)3-4.25 mm long, 0.5-1.5 mm wide, apex obtuse or acute; stamens 4-5; anthers linear-lanceolate, (1-)1.5-1.75(-2.25) mm long, 0.2-0.4 mm wide; filaments 0.25-0.75 mm long, 0.1-0.3 mm wide; stigma lobes ovate-elliptic, 0.2-0.5(-0.75) mm long, 0.1-0.25 mm wide; style 1-1.75(-2.1) mm long, 0.1-0.3 mm wide. Fruits subglobose or ovoid, 2-7 mm long, 2-9 mm wide, glabrous, locules 2-3. Stalks subterete, 1.25-3.25 mm long, 1-1.5 mm wide. Seeds ovoid or globose, 3.75-6 mm long, 3.5-4.75 mm wide, 0.5-1 mm thick, 1-2 per locule.

Field notes. Small tree or shrub, 1.5-2 m height; stem lignosus; leaves elliptic, 8-23 cm long, glabrous, dark green or pale green coloured; petiole long; inflorescences terminal; flowers white or dark purple coloured, very fragrant; corolla tube purple coloured; infructescence terminal; fruit globose, green coloured..

Distribution. Sumatra, Borneo, and Malay Peninsula. In Indonesia, this species is recorded from North Sumatra, West Sumatra and South Sumatra.

Habitat and ecology. They can be found along riverbanks or lowland forest, at altitude 40-650 m above sea level.

Vernacular names. Jarum-Jarum Betina, Kayu Kuni, Kayu Kemik (Minangkabau).

Specimens examined. **North Sumatra**: Lumut, *Jughuhn* s.n. (BO!). **West Sumatra**: Indrapura, alt. 200 m, fl. bud, fr., 4 Jan. 1983, *Ninik Mulyati Rahayu* 566 (BO!); Bt. Gajabuih, Ulu Gadut, about 15 km east from Padang, alt. 40-650 m, fl. bud, 14 Dec. 1980, *M. Hotta* 25293 (BO!); ibid., 0^0 55' S 100^0 30' E, alt. 500-800 m, fl., 27 Aug. 1988, *H. Nagamasu* 3157 (ANDA!); ibid., alt. 600-650 m, fl., fr., 31 Aug. 1989, *R. Tamin & H. Hasnah* 275 (ANDA!); ibid., alt. 500 m, fl., fr., 14 Jan. 1981, *R. Tamin* 140 (ANDA!); Bukit Pinang-Pinang, Ulu Gadut, about 15 km east from Padang, alt. 250-600 m, fl., 19 Dec.1995, *Aulia* 142 (ANDA!); Hutan Pendidikan dan Penelitian Biologi (HPPB) Univ. Andalas, 12 km east from Padang, alt. 300-400 m, fr., 3 Dec.1993, *Rosni, Nirma, Nanik & Yon* 40 (ANDA!); ibid., fr., 3 Dec. 1993, *Rita, Delfia, Riri & Ari* 10 (ANDA!); ibid., fr., 4 Dec. 1993, *B. Surbakti, Betsy, Asdelina & Wiwid* 72 (ANDA!); ibid.., fr., 4 Dec. 1993, *Feny, Rista, Rini, Main & Win* 31 (ANDA!); ibid., fr., 4 Dec. 1993, *Yarsi, Eva, Esi, Yul & Zeti* 27 (ANDA!); ibid., alt. 250-450 m, fl., 12 Oct. 1994, *Iskandar* 10 (ANDA!); ibid., alt. 330-450 m, fl., fr., 30 Sept. 1990, *Owa* 18 (ANDA!); Limau Manis, Botanical Garden of Andalas University, about 18 km eastern of Padang City, fl., 8 April 2007, *Suratman & Ari Anggara* 1 (ANDA!); Bukit Tambun Tulang, Kec. 2 x 11 Enam Lingkung, Kab. Padang Pariaman, about 60 km north from Padang, alt. 250-450 m, fr., 14 Nov. 1999, *Yesi, Elvi, Rini & Nita* 14 (ANDA!); ibid., fr., 7 Nov. 1998, *Mince, Reni, Hafizah & Asri* 35 (ANDA!); Lembah Anai, Kab. Tanah Datar, about 63 km north from Padang, alt. 250-500 m, fl., fr., 1-2 April 2000, *Win Atriosa & Tim Herbarium* 37 (ANDA!); Ds. Sipisang, Kayu Tanam, Kab. Padang Pariaman, about 55 km north from Padang, alt. 100-400 m, fl., fr., 26 Nov. 1995, *Shinta, Tristina & Feri* 36 (ANDA!); ibid., alt. 100-400 m, fl., fr., 6 April 1997, *Venny, Emi, Silvia, Anti & Yel* 74 (ANDA!); Ds. Geringging Malampah, about 60 km south from Lubuk Sikaping, Kab. Pasaman, alt. 250-500 m, fr., 5 Nov. 1995, *Lia, Liza & Elsa* 39 (ANDA!); ibid., alt. 200-500 m, fl., fr., 5 Nov. 1995, *Ken, Susi & Vita* 41 (ANDA!); Kampung Tangah, Anduring Kayu Tanam, about 55 km north from Padang City, alt. 80-210 m, fl., 6 May 1995, *Dwi, Deri & Desi* 17 (ANDA!); Pesisir Selatan, about 50 km south from Padang City, alt. 100 m, fr., 6 June 1996, *Nius K.* 56 (ANDA!); Ds. Cindakir, Kec. Bungus, Tl. Kabung, about 25 km east from Padang City, alt. 50-100 m, fl., fr., 3 April 1994, *Sureni, Deti & Jumi* 10 (ANDA!); along river of Batang Asam Pulau, about 9 km South West Lubuk Alung, alt. 60-100 m, fl., 2-3 Nov. 1991, *NAS* 022 (ANDA!); Batu Busuk, Limau Manis, about 14 km from Padang City, alt. 200-450 m, fl., fr., 20 Oct. 1994, *Iskandar* 17 (ANDA!) Puncak Anai, Malibou Anai, Kab. Padang Pariaman, about 55 km north from Padang City, alt. 450-600 m, fr., 12 June 2004, *Chichilia, Yoze, Leni D, Maimunah, Dewi & Indah* 29 (ANDA!). **South Sumatra**: Kota Agung, fl. bud, 20 Feb. 1971, *Soegeng Reksodihardjo* 667 (BO!). **Sumatra:** without locality, fr., *anonymus* 18469 HB (BO!); ibid., fr., *anonymus* s.n. (BO!).

2. *Rennellia elongata* (King & Gamble) Ridl.

Rennellia elongata (King & Gamble) Ridl., Kew Bull. (1939) 608; K.M. Wong, Gard. Bull. Sing. 37 (2) (1984) 195-196; K.M. Wong in Ng, Tree Fl. Malay. IV (1989) 405. *Rennellia speciosa* var. *elongata* King & Gamble, Journ. As. Soc. Beng. 73 (1904) 90; Ridl., Fl. Malay. Penins. II (1923) 120. Type: Malay Peninsula, Pahang, Tahan River, *Ridley* 5834 (Lectotype SING).

Shrub or small tree or tree, 1.5-10 m height, 7-10 cm wide at breast high. Branchlets quadrangular or subquadrangular when young and becoming subquadrangular or quadrangular or subterete with age, bark not glossy; internodes 3-285 mm long, 1-9 mm wide, 1-7 mm thick; wood yellow coloured. Stipules broadly triangular or triangular, short-connated or almost free or connated along edges when young growth, apex short-bifid or acute or acuminate, submembraneous or chartaceous or subcoriaceous, veins indistinct, 2-9(-10) mm long, 2-6(-8) mm wide. Petioles sub semiterete or semiterete or subterete or subquadrangular, flattened or protruded, 5-35 (-40) mm long, 0.5-3(-5) mm wide. Lamina oblong or broadly oblong or elliptic-oblong or oblong-lanceolate or obovate or obovate-oblong or obovate-lanceolate or lanceolate, 8.5-30.5(-40.8) cm long, 2.5-14 cm wide, apex acuminate or acute, chartaceous to coriaceous when dry, drying colour pale yellow to brown when dry; secondary veins 6-13 pairs, raised prominently below, flat to prominently raised above; midribs flat to prominently raised above; tertiary veins flat to prominently raised below, indistinct to moderately raised above. Bracts triangular or narrowly triangular or broadly triangular, apex short-bifid or acute or acuminate, subchartaceous or chartaceous or submembraneous when dry, glabrous or slightly papillose, 0.25-2.75 mm long, 0.2-1.5(-2) mm wide. Inflorescences axis subquadrangular or thin subquadrangular, (37-)47-155 mm long, (0.75-)1-3 mm wide, internodes 0.5-15 mm long; peduncles absent or present, thin subqudrangular or subterete or thin subterete, 0.25-1 mm long, 0.5-1.5(-2) mm wide. Flowering heads arranged in a spike or spike-like, sessile or subsessile, 3-18 tiers along the inflorescence axis, each head with (1-)2-3(-4) flowers, 2-8 mm long, 2.5-8 mm wide. Flowers heterostylous, 5-22.5 mm long, 1-3.5 mm wide; calyx tube campanulate or subcampanulate, 0.5-2.25(-3) mm long, 1-3.5(-4) mm wide; corolla tube 1-10 mm long and 1-2 mm wide in the bud stage but can reach 11-21 mm long in mature open flowers; corolla lobes 4-5, oblong to lanceolate or lanceolate or oblong-elliptic or linier-oblong or linier-lanceolate, apex obtuse or acute, 3-6 mm long and 0.5-2 mm wide in the bud stage but can reach 6.5-9 mm long in mature open flowers; stamens (4-)5(-6); anthers linear-lanceolate or lanceolate or linear, (1.75-)2 (-4.25) mm long and (0.1-)0.2-0.5 mm wide in immature flowers but can reach (2.5-)3.75-4.5(-5) mm long in mature open flowers; filaments 0.5-2 mm long, 0.1-0.5 mm wide; stigma lobes oblong-lanceolate or linear-lanceolate or elliptic or elliptic-oblong, 0.5-1.75(-2.25) mm long, (0.1-) 0.2-0.5 mm wide; style (1.75-)2-8(-10) mm long and 0.1-0.3(-0.5) mm wide in the bud stage but can reach 11.5-20.5 mm long in mature open flowers. Fruits subglobose or ellipsoid or ovoid, 6-14 mm long, 5-13 mm wide, 1-2 locule. Stalks none or very short, thin subterete or subterete or thin subquadrangular, 1(-2) mm long, 0.5-1(-2.5) mm wide. Seeds subglobose, 4-8 mm long, 3.5-9.5 mm wide, (0.25-)1-5(-6) mm thick, 1 per locule.

Field notes. Shrub or small tree or tree, 1.5-10 m height, 7-10 cm wide at breast high; bark light grey-brown, inner bark brown, thin, slightly rugose; wood yellow. Leaves fleshy, dark green. Flowers terminally. Corolla violet and white greenish at base. Calyx dark violet. Fruits compound and aggregated in 3's; ripening purple or bluish-black or black from green or dark green; smooth. Individual fruit with one seed. Seeds semi-transluscent, white coloured in cross section.

Distribution. Sumatra, Borneo and Malay Peninsula. In Indonesia, this species can be found in North Sumatra, West Sumatra, West Kalimantan, Central Kalimantan and East Kalimantan.

Habitat and ecology. They can be found in primary forest or primary mountain forest, very gentle slope, hilly terrain, red clay soil, by river, mixed primary *Dipterocarpaceae* forest, sandy soil, associates includes *Shorea, Knema, Lithocarpus* and *Artocarpus* at altitude 75-1000 m above sea level.

Vernacular names. Kayu Karap (Dayak).

Specimens examined. **North Sumatra**: Masihi, fl.bud, Aug. 1927, *H.S Yates* 2642 (BO!). **West Sumatra**: Bt. Gajabuih, Ulu Gadut, about 15 km east from Padang, alt. 400-650 m, fl. bud, fr., 5 Jan. 1981, *M Hotta* 25841(BO!). **West Kalimantan**: Mt. Damoes, fl. bud, fr.,1893-1894, *H. Hallier* 445 (BO!); Bukit Raya, 0° 45' S, 112° 45' E, alt.130 m, fr. immature, 4 Dec. 1982, *Nooteboom* 4136 (BO!); ibid., 0° 39' S, 112° 42' E, alt. 400-1000 m, fr., 24 Jan. 1983, *Nooteboom* 4626 (BO!); ibid., 0° 45' S, 112° 47' E, alt.150 m, 6 Nov. 1983, *Nooteboom* 4861 (BO!); Serawai, 0° 30' 57.9" S, 112° 36' 7.1" E, alt. 120 m, fr., 26 Jan. 1995, *Church, A.C., Mahyar, U.W. & Afriastini* 1499 (BO!). **Central Kalimantan:** Kuala Kurun, alt. 75 m, fr. immature, 10 March 1979, *Tukirin P.* 524 (BO!); Samba, 0° 43' 22.5" S, 112° 50' 37.5" E, alt. 265 m, fr., 27 Jan. 1995, *Jarvie, J.K. & Ruskandi, A.* 5429 (BO!); ibid., 0° 43' 5.2" S, 112° 50' 37.3" E, alt. 270 m, fr., 29 Jan. 1995, *Jarvie, J.K. & Ruskandi, A.* 5652 (BO!); ibid., 0° 42' 39.6" S, 112° 50' 17.7" E, alt. 250 m, fr., 4 Feb.1995, *Jarvie, J.K. & Ruskandi, A.* 5978 (BO!). **East Kalimantan***:* Magne River, fl.bud, 1896-1897, *Jaheri* 604 (BO!); Dingei River, fl. bud, 1896-1897, *Jaheri 796* (BO!); Pary River, fl. bud, 1896-1897, *Jaheri* 1409 (BO!); Mt. Tenampak, fr., Sept.1912, *Amdjah 609* (BO!); Malinau, Kayan Mentarang National Park, alt. 200-500 m, fr., 12 Sept. 2002, *Miyako Koizumi & Lam MK* 961 (BO!).

3. *Rennellia morindiformis* (Korth.) Ridl.

Rennellia morindiformis (Korth.) Ridl., Kew Bull.(1939) 609; Johansson, Blumea 34 (1989) 15. *Tribrachya morindaeformis* Korth., Nederl. Kruidk. Arch. II (1851) 255; Miq., Fl. Ned. Ind. II (1856) 247; Boerl., Handl. Fl. Ned. Ind. II (1899) 95. *Morinda korthalsiana* Miq., Ann. Mus. Bot. Lugd. Bat. IV (1869) 212-213; Boerl., Handl. Fl. Ned. Ind. II (1899) 95. *Morinda tribrachya* K. Schum., in Engler & Prantl, Nat. Pflanzenfam. 4 (1891) 138. *Rennellia* sp., K.M. Wong, Gard. Bull. Sing. 37 (2) (1984) 197-198. Type: Sumatra, Mount Singgalang, *Korthals* s.n. (Lectotype L; Isolectotype K, L).

Tree or shrub. Branchlets when young quadrangular and becoming subquadrangular or quadrangular with age, bark pale yellow whitish or pale yellow to brown coloured when dry, glossy; internodes 9-60 mm long, 1-2.5 mm wide, 0.5-2 mm thick. Stipules triangular, short-connated, apex shortly bifid or acute or acuminate, submembraneous or subchartaceous, veins indistinct, 4-4.5 mm long, 2-3 mm wide. Petioles semi-terete, flattened, 11-19 mm long, 1-1.2 mm wide. Lamina obovate-oblong or oblong, 7.3-14.6 cm long, 2.4-4.3 cm wide, apex acuminate or shortly cuspidate, chartaceous when dry, drying colour pale yellow to light brown below and light brown above; secondary veins 6-8 pairs, raised prominently; midribs flat to moderately raised above; tertiary veins flat to raised prominently below and raised slightly above. Bracts triangular, apex short-bifid or acute, glabrous, submembraneous, 1-1.5 mm long, 0.5-0.75 mm wide. Inflorescences axis thin subquadrangular, 34-35 mm long, 1-1.75 mm wide, internodes 9-14 mm long; peduncles (8-)9.5-20 mm long, 0.9-1.5 mm wide. Flowering heads arranged in a raceme-like structure, 2-4 tiers along the inflorescence axis, each head with (2-)3 flowers, 4-6 mm long, 4-6 mm wide. Flowers homostylous, 8-12.25 mm long, 1-3 mm wide; calyx tube subcampanulate, 1.25-2 mm long, 1.75-3 mm wide; corolla tube 1-2 mm long and 0.5-1.5 mm wide; corolla lobes 4, linear-lanceolate, 7-10.5 mm long and 0.5-2 mm wide, apex acute; stamens 4-5; anthers linear or linear-lanceolate, 1.10-1.5 mm long, 0.1 mm wide; filaments very short; stigma lobes ovate or elliptic, 0.2-0.3 mm long, 0.1 mm wide; style 1.25-2 mm long, 0.1-0.2 mm wide. Fruits and seeds not seen.

Field notes. Tree or shrub; stem lignosus; flower terminal, yellow or yellow greenish or dark purple coloured; leaves glabrous.

Distribution. Sumatra and Malay Peninsula. In Indonesia, this species can be found in West Sumatra.

Habitat and ecology. They can be found in rain forest, at altitude 400-650 m above sea level.

Specimens examined. **West Sumatra**: Taman Hutan Raya Dr. Moh. Hatta, Ladang Padi, about 21 km east from Padang City, alt. 400-650 m, fl., 7 May 1994, *Abi, Erni, Betty, Nius & Zeti* 99 (ANDA!); ibid., *Feri, Lani, May & Yuli* 58 (ANDA!); ibid., 8 May 1994, *Deden, Fera, Reni, Is & Wiwin* 62 (ANDA!). **Sumatra:** unknown locality, fl. bud, *Korthals* s.n. (BO!); ibid., fl., *anonymous* s.n. (BO!)

4. *Rennellia speciosa* (Wall. ex Kurz) Hook.f.

Rennellia speciosa (Wall. ex Kurz) Hook.f., Fl. Brit. Ind. III (1880) 158; King & Gamble, Journ. As. Soc. Beng. 73 (1904) 89; Ridl., Fl. Malay. Penins.II (1923) 120; Pitard in Lecomte & Humbert, Fl. Gen. Indo-Chine III (1924) 427; Burkill, A Dictionary of the Economic Products of the Malay Peninsula (1935) 1888-1889; Corner, Ways. Trees Malay. I (1940) 558; Henderson, Malayan Wild Flow. (1959) 220; K.M. Wong, Gard. Bull. Sing. 37 (2) (1984) 197; K.M. Wong in Ng, Tree Fl. Malay. IV (1989) 405; Johansson, Blumea 34 (1989) 11. *Morinda speciosa* [Wallich 1847, no. 8436, nom. nud] ex Kurz, Prel. Rep. (1875) 60; Kurz, For. Fl. British Burm. 2 (1877) 62. Type: Burma, Tenaserrim, Chappadong Hill, *Wall. Cat.* 8436 (Holotype K).

Shrub, 1.5 m height. Branchlets when young quadrangular and becoming subquadrangular or quadrangular or subterete with age, bark glossy or not, pale yellow to brown coloured when dry; internodes 5-79 mm long, 1-5 mm wide, 1.5-5.5 mm thick. Stipules broadly triangular or ovate, short-connated or almost free, apex short-bifid or obtuse or acute or acuminate, submembraneous or subchartaceous, veins distinct on inner surface or indistinct on both sides, 2-10 mm long, 2-8 mm wide. Petioles semiterete or sub semiterete or sub terete, flattened or slightly protruded, 13-45 mm long, 0.5-2 mm wide. Lamina obovate or obovate-oblong or oblong, 11.2-25.5 cm long, 3-8.8 cm wide, apex acuminate, chartaceous when dry, drying colour pale yellow brownish or light brown or brown or brown greyish below and pale yellow whitish or pale yellow brownish or grey brownish or brown above; secondary veins 6-12 pairs, slightly to prominently raised below and flat to moderately raised above; midribs slightly to prominently raised above; tertiary veins flat to slightly raised below and slightly raised to indistinct above. Bracts triangular, apex short-bifid, glabrous, membraneous, 0.5 mm long, 0.25 mm wide. Inflorescences axis thin subquadrangular, 11-26(-70) mm long, 0.75-2 mm wide, internodes 0.5-6(-9) mm long; peduncles subterete or thin subquadrangular or subquadrangular, (2.5-)3.5-9 mm long, (0.5-)0.75-1.5 mm wide. Flowering heads arranged in a raceme-like structure, (2-)4-6(-9) tiers along the inflorescence axis, each head with (1-)2-3 flowers, 1.5-3(-6) mm long, 1.5-3.5(-7) mm

wide. Flowers heterostylous, 2.75-12(-22) mm long and 1-2.5 mm wide in the bud stage but can reach 25-27 mm long in mature open flowers; calyx tube campanulate or subcampanulate, (0.5-)1-2(-4) mm long, 1-2.5(-4) mm wide; corolla tube (1-)9-20 mm long and (0.5-) 1-2.5 mm wide in the bud stage but can reach 22-26 mm long in mature open flowers; corolla lobes 4-5, elliptic-oblong or obovate-oblong or oblong or lanceolate or linear-lanceolate, (1.75-)5-8.5 mm long and (0.75-)1.5-2.75 mm wide in immature flowers but can reach 9 mm long and 2-3.5(-4.5) mm wide in mature open flowers, apex obtuse or acute; stamens 4-5; anthers linear-lanceolate or linear, 2.25-4 mm long, 0.25-0.75 mm wide; filaments 0.5-1.5 mm long, 0.1-0.25 mm wide; stigma lobes ovate or elliptic or linear-lanceolate, 0.5-0.75(-3) mm long, 0.1-0.5 mm wide; style 1-2.75 mm long and 0.1-0.3 mm wide in immature flowers but can reach 5-25 mm long in mature flowers. Fruits and seeds not seen.

Field notes. Shrub 1.5 m, understroy, monocaulous or not; leaves fleshy, dark green above and light green below; inflorescences dark purple; flowers very fragrant, corolla pentamerous and white coloured.

Distribution. Burma, Thailand, Borneo, Sumatra and Malay Peninsula. In Indonesia, this species is recorded from North Sumatra, Bengkulu and Lampung.

Habitat and ecology. They can be found commonly in the primary and secondary forest, closed canopy lowland forest, lowlands and mountains, altitude 335-700 m above sea level.

Vernacular names. Mengkudu Rimba, Lempedu Tanah, Semboran Angin, Meroyan Kemput, Meroyan Metemak (Malay).

Uses. The decoction of the bark or roots of *R. speciosa* is administrated for dropsy and pains in the bones, and one made from the leaves and roots may be used in a bath to cure rheumatism. The plants are also given after childbirth as a protective medicine (Burkill, 1935).

Specimens examined. **North Sumatra**: Batangtoru, 01° 30' 41" N, 99° 04' 32" E, alt. 400 m, fl., 4 June 2003, *W. Takeuchi & E. Sambas* 18181 (BO!); ibid., 01° 31' 23" N, 99° 03' 39" E, alt. 335 m, fl., 12 June 2003, *W. Takeuchi & E. Sambas* 18397 (BO!). **Bengkulu:** Simpangloenik, alt. 500 m, fl. bud, 26 May 1931, *v.d. Pyl* 369. **Lampung**: Krui, alt. 700 m, fl., 16 July 1936, *de Voogd* 1485 (BO!).

CONCLUSION

Based on the investigation of morphological characters, there were four species of *Rennellia* in Indonesia that can be recognized, i.e., *Rennellia elliptica* Korth., *Rennellia elongata* (King & Gamble) Ridl., *Rennellia morindiformis* (Korth.) Ridl., and *Rennellia speciosa* (Wall. ex Kurz) Hook.f.

ACKNOWLEDGMENTS

I would like to express my gratitude to the Keepers of the Herbarium Bogoriense (BO) and Herbarium of Andalas University (ANDA) who gave the opportunity and facilities to study specimens. My sincere thanks are due to Prof. Dr. Khoon Meng Wong from the Institute of Biological Sciences, University of Malaya, Malaysia for a critical reading of the manuscripts and also provided his article for my references. Thanks are also due to Dr. Jan Thomas Johansson at Department of Botany, University of Stockholm, Sweden who was so kindly to provide some important literatures. I am also grateful to Prof. Dr. Mien A. Rifai from Herbarium Bogoriense for his valuable criticism.

REFERENCES

Bentham, G. and J. D. Hooker. 1873. *Genera Plantarum* 2. Londini: L. Reeve and Co.

Boerlage, J.G.1899. *Handleiding tot de Kennis der Flora van Nederlandsch Indië*. Tweede Deel. Leiden: E.J.Brill.

Burkill, I. H. 1935. *A Dictionary of The Economic Products of The Malay Peninsula*. London: Government of The Straits Settlement and Federated Malay States by The Crown Agent for The Colonies.

Corner, E.J.H. 1940. *Wayside Trees of Malaya* Volume I. Singapore: W.T. Cherry, Government Printer.

Harris, J. G. and M. W. Harris. 1994. *Plant Identification Terminology: An Illustration Glossary.* Utah: Springe Lake Publishing.

Henderson, M. R.1959. *Malayan Wild Flowers: Dicotyledons.* Kuala Lumpur: The Malayan Nature Society.

Hooker, J.D. 1880. *The Flora of British India. Volume III: Caprifoliaceae to Apocynaceae.* London: L. Reeve and Co.

Johansson, J.T. 1989. Revision of the genus **Rennellia** Korth. (Rubiaceae-Rubioideae). *Blumea* 34: 3-19.

King, G. and J.S. Gamble. 1904. Materials for a flora of the Malayan Peninsula. *Journal of the Asiatic Society of Bengal* 73: 89 -90.

Korthals, P.W. 1851. Overzigt der Rubiaceën van de Nederlandsch-oostindische Kolonien. *Nederlandsch Kruidkundig Archief* 2: 255-257.

Kurz, W.S. 1875. *Preliminary Report on the Forest and Other Vegetation of Pegu. Appendix B. General Key to The Burmese Trees.* Calcutta: Baptist Mission Press

Kurz, W.S. 1877. *Forest Flora of British Burma* 2. Calcutta: Office of the Superintendent of Government Printing

Lawrence, G.H.M. 1955. *Taxonomy of Vascular Plants*. New York: The Macmillan Company.

Miquel, F.A.W. 1856. *Flora van Nederlandsch Indië*. Tweede Deel. Amsterdam: Leipzig, bij Fried Fleischer.

Miquel, F.A.G. 1869. Ecloge rubiacearum archipelagi Indici. *Annales Musei Botanici Lugduno-Batave* 4: 212-213.

Pitard, J. 1924. Rubiacées. *In*: Lecomte, H. and H. Humbert (eds.). *Flore Générale de L'Indo-Chine III*. Paris: Masson et C^{ie}, Editeurs.

Puff, C. and K.M. Wong. 1993. A synopsis of the genera of Rubiaceae in Borneo. *Sandakania* 2: 13-34.

Ridley, H.N. 1923. *The Flora of the Malay Peninsula.* Volume II: Gamopetalae. London: L.Reeve and Co.Ltd.

Ridley, H.N. 1939. Notes on some Malayan Rubiaceae. Morindeae. *Kew Bulletin*: 600-611.

Schumann, K.M. 1891. Rubiaceae. *In*: Engler, A. and K. Prantl (eds.). *Die Natürlichen Pflanzenfamilien*. IV Teill. Leipzig: Wilhelm Engelmann.

Stearn, W.T.1996. *Botanical Latin*. 4th ed. England: Redwood Press Ltd.

Veldkamp, J.F.1987. Sequence of organs and terminology of characters. *In* Vogel, E.F. (ed.). *Manual of Herbarium Taxonomy Theory and Practice*. Jakarta: UNESCO.

Wong, K.M. 1984. A Revision of **Rennellia** (Rubiaceae) in the Malay Peninsula. *Gardens' Bulletin Singapore* 37 (2):193-198.

Wong, K.M. 1989. **Rennellia** Korth. (Rubiaceae). *In* Ng, F.S.P. (ed.). *Tree Flora of Malaya Volume IV: A Manual for Foresters.* Selangor: Longman Malaysia Sdn Berhad.