

REINWARDTIA

REINWARDTIA

*A JOURNAL ON TAXONOMIC BOTANY
PLANT SOCIOLOGY AND ECOLOGY*

Vol. 13(2): 95 — 220, November 2, 2010

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A NEW SPECIES OF RAFFLESIA (RAFFLESiaceae) FROM NORTH SUMATRA

Received November 3, 2009; accepted February 2, 2010

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ABSTRACT

WIRIADINATA, H. & SARI, R. 2010. A new species of *Rafflesia* (*Rafflesiaceae*) from North Sumatra. *Reinwardtia* 13(2): 95–100. — *Rafflesia meijeri* Wiriadinata & Sari *spec. nov.* from North Sumatra is described. It appears closely related to *R. rochussenii* Teijsm. & Binn. from West Java which has no processes on the disk, smaller flower, the lobes with a different wart pattern, a wider groove with thin lamellae on the central column, ramenta filiform without swollen apex.

Key words: *Rafflesia meijeri*, *Rafflesiaceae*, North Sumatra, taxonomy.

ABSTRAK

WIRIADINATA, H. & SARI, R. 2010. Satu jenis baru *Rafflesia* (*Rafflesiaceae*) dari Sumatera Utara. *Reinwardtia* 13 (2): 95–100. — *Rafflesia meijeri* Wiriadinata & Sari berasal dari Sumatera Utara dipertelakan untuk pertama kalinya. Jenis tersebut berbeda dengan *R. rochussenii* Teijsm. & Binn. dari Jawa Barat yang tidak mempunyai *processes* pada bagian atas cawan, mempunyai corak berbeda pada permukaan cuping, alur yang lebar dengan dinding tipis pada bagian atas *central column* dan ramenta yang berupa rambut sederhana tanpa benjolan pada ujungnya serta ukuran bunga lebih kecil.

Kata kunci: *Rafflesia meijeri*, *Rafflesiaceae*, Sumatera Utara, taksonomi.

INTRODUCTION

During an expedition to the north of the Taman Wisata Alam (TWA= Recreation Nature Forest) Sicikeh–cikeh, North Sumatra, in early 2003, it was a surprise that a new species of *Rafflesia* R. Br. (*Rafflesiaceae*) encountered. This species is similar to *R. rochussenii* Teijsm. & Binn. of West Java (Fig.1), which also has no processes on the disc. The genus *Rafflesia* in the world has at least 27 known species (Mat–Salleh *et al.*, 2010.) This super–parasitic plant with its gigantic flower has long been a source of fascination to botanists and laymen. These species are very rare in nature and of great local and international interest and a major tourist’s attraction (Mat–Salleh & Latiff, 1989). They are threatened by the destruction of their habitat through logging and clearing for *e.g.* oil palm plantations. Unfortunately, attempts to grow the plants in Botanic Gardens have met with very limited success (Veldkamp, 2007). Recently, however, the Bogor Botanic Garden has successfully cultivated *R. patma* Blume of West Java. Several species

of narrowly endemic have also provided botanists with insights into the evolution and biogeography of tropical biodiversity (See *e.g.* Barkman *et al.*, 2008; Davis *et al.*, 2007; Barcelona *et al.*, 2009a; 2009b).

The taxonomy of the genus *Rafflesia* is also very unique because the species delimitation is based only on details of the flower morphology, since the vegetative part consist of mycelium–like structure living inside the root or bole of the specific host of particularly species of family *Vitaceae*, especially *Tetrastigma coriaceum* (DC.) Gagnep. which usually has been misidentified as *T. leucostaphylum* (Dennst.) N.P. Balakr. (Veldkamp, 2009). In his revision of Malesian *Rafflesiaceae*, Meijer (1998) recorded 14 taxa of which seven occur in Indonesia, the rest are distributed in S. Thailand, the Malay Peninsula, N. Borneo (Brunei, Sabah, Sarawak) and The Philippines. Furthermore he united *R. titan* Jack and *R. atjehensis* Koord. to *R. arnoldi* R. Br. thus leaving the Sumatran species he recognized to five species namely *R. arnoldi*, *R. arnoldi* var. *atjehensis* (Koord.) Meijer, and *R. microphylla* Meijer which is distributed in Aceh, R.



Fig. 1. *Rafflesia rochussenii* (Photo: Anonim–Lawalata IPB)

arnoldi and *R. gadutensis* Meijer in West Sumatra, and *R. hasseltii* Suringar in Riau and Jambi. *Rafflesia arnoldi* was considered as widely distributed and to be quite variable in morphology between individual and in populations. Recently a new species *Rafflesia bengkuluensis* was published by Susatya, Arianto and Mat–Salleh (Susatya *et al.*, 2005), and *R. lawangensis* Mat–Salleh *et al.* (2010) which indicated that undescribed, “new” species may still be out there.

Almost all species have processes on the disc except *R. rochussenii* which occurs on Mt. Salak and Mts. Gede–Pangrango, West Java (Backer & Bakhuizen van den Brink Jr., 1964; Anonim, 1990; Wiriadinata & Alam, 1990; Wiriadinata, 1993; Zuhud *et al.*, 1998; Meijer, 1998). *Rafflesia rochussenii* var. *subaculeata* has 1–8 processes and Jafarsidik & Meijer (1985, “1983”) have suggested that this might be a hybrid between *R. patma* and *R. rochussenii*.

In the Recreation Natural Forest (TWA) Sicikeh–cikeh, North Sumatra, a small population of *Rafflesia* occurs which has no processes and after a long study we decided that it represents a new species.

***Rafflesia meijeri* Wiriadinata & Sari, spec. nov.**
Figs. 2–6.

Rafflesia rochussenii similis disco sine processibus, floribus minoribus 13–14 cm diam., ramentis filiformibus apice non inflatis differt. — Type: Indonesia, North Sumatra, TWA Sicikeh–cikeh, Dairi, N:



Fig. 2. *Rafflesia meijeri* Wiriadinata & Sari (Photo: Rismita Sari)

02° 39′ 826″; E: 98° 23′ 385″, 1320 m asl. 16 Sep. 2003, male fl., Rismita Sari RI 413 (BO–holotype).

Mature bud ca. 9–10 cm in diam. *Male flower* ca. 13–14 cm across, ca. 5–6 cm high. *Perigone lobes* 5–6 x 3.7–4.5 cm, on the upper side coarsely reddish brick–coloured, lower side smooth. *Perigone tube* ca. 4.5–5 cm high, ca. 9–10 cm wide. *Diaphragm* ca. 8.5 cm diam., slightly 5–angular, 2.5 cm wide, reddish, ovate–oblong, with whitish orange warts, opening of diaphragm ca. 4.5 cm, wider than in *R. rochussenii*. *Ramenta* filiform, simple, without a swollen apex, dark red white coloured at the tip, 0.5–2.5 mm up to ca. 8 mm long near base of the perigone tube. *Disk* ca. 6–6.5 cm diam., rim raised, without processes. *Anthers* 20. Annulus exterior a curved rim, short, ca. 3 mm. *Column* ca. 1.5 cm high, ca. 3 cm in diam. at the neck, groove very wide, lamellae with very thin walls.

Distribution. Sumatra: endemic to North Sumatra, only known from a male population at the type locality Recreation Nature Forest (TWA) Sicikeh–cikeh, North Sumatra, about 1.5 km from Laehole village.

Habitat. Secondary hilly forest with moderately steep slopes at 1320 m asl. *Rafflesia meijeri* was found in disturbed hilly primary forest associated with *Fagaceae*, *Lauraceae*, *Leguminosae*, *Rubiaceae*, *Zingiberaceae*, etc. Flowering: September at the beginning of the rainy season.

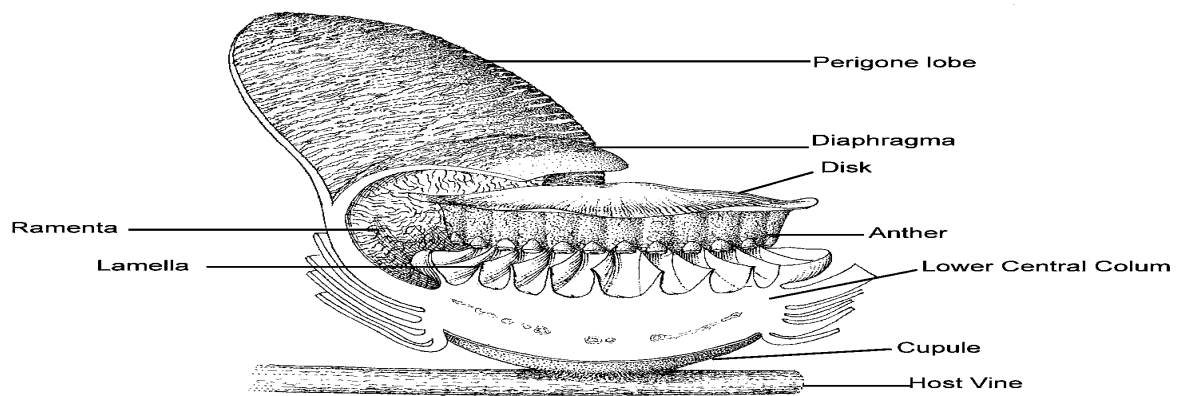


Fig. 3. Cross section of *Rafflesia meijeri*. After Rismita Sari RI 413 (drawn by Subari)

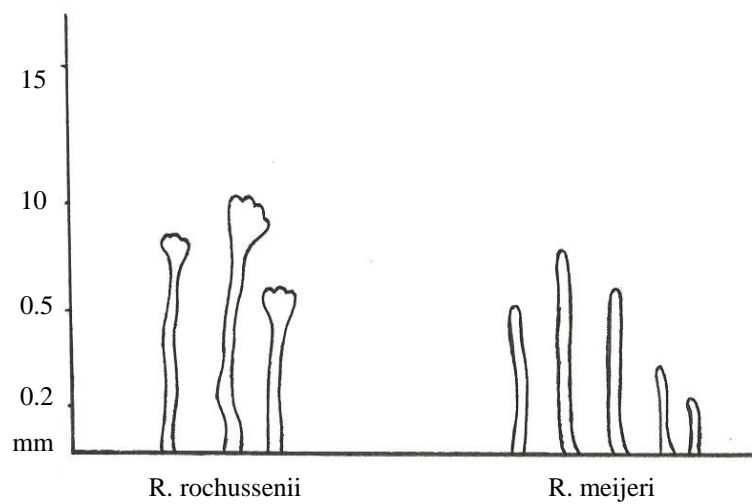


Fig. 4. Comparison of ramenta of *Rafflesia rochussenii* and *R. meijeri* (drawn by Subari)



Fig. 5. *R. meijeri* showing simple filiform ramenta (Photo: Harry Wiriadinata)



Fig. 6. *R. meijeri* showing close up simple ramenta (Photo: Harry Wiriadinata)

Notes. It is similar to *Rafflesia rochussenii* which also has no processes on its disk (Meijer, 1998) and occurs on the slopes of Mts. Gede Pangrango National Park and of Mt. Salak, West Java (Anonim, 1990). However, the new species can be easily distinguished by the smaller size of the flower, the pattern of the warts on the diaphragm and perianth lobes, the angular opening of the diaphragm, and

the simple filiform ramenta.

Etimology. Named after Prof. Dr. Willem Meijer (1923–2003), in acknowledgement of his contribution toward the study and conservation of *Rafflesia*.

Specimen examined. SUMATRA. Taman Wisata Alam (TWA) Sicikeh–cikeh, Laehole village, Pansur Nauli,

Table 1. Comparison of *Rafflesia meijeri* and *R. rochussenii*

Character	<i>Rafflesia meijeri</i>	<i>Rafflesia rochussenii</i>
Flowers diameter	9–10 cm	18–20 cm
Flowers height	ca. 5–6 cm	ca. 10 cm
Perigone lobes	5–6 cm x 3.7–4.5 cm	ca. 7.7 cm x 8.2 cm
Perigone tube	ca. 4.5–5 cm	ca. 6.5 cm
Diaphragm	5–angular	rounded
Warts	irregular	regular
Opening of diaphragm	ca. 4.5 cm	5.7–6.7 cm
Disk diameter	ca. 6–6.5 cm	ca. 9 cm
Processes	none	none (1–8)
Rim of processes	slightly raised	flat
Column	1.5 cm	2 cm
Ramenta inside base	0.5–8 mm	10 mm
Tip of ramenta	not swollen	swollen
Anthers	20	22 (15–20)

Parbuluan, Daeri, North Sumatra, hilly primary forest, 1320 m asl., male flower, 16 Sep. 2003, *Rismita Sari RI 413* (BO).

ACKNOWLEDGEMENTS

The second author would like to thank Dr. Dedy Dar-naedi, Sutrisno, Sri Hartini, Dachrijani Mardi and Awen Supranata. Special thanks to the team of the Bogor Botanic Gardens who attended the expedition to the Sicikeh–cikeh TWA: Abednego Purba, Bonar Malau, Endang Suparta, Madhari, Nelson I. Hutagalung, Oskar Sihombing, Ratna Suti Astuti, Saripudin, Wanri Malau, and Yusuf Ismail. We would like to thank Dr. J.F. Veldkamp (L) who provided the Latin diagnosis and critically read the manuscript. We also thank Prof. Dr. A. Latiff Mohamad (UKM) for his support and comments. Last but not least thank to Mr. Subari for excellent drawing of the specimen.

REFERENCES

- ANONIM, 1990. *Press release penemuan Rafflesia di Gunung Salak, Jawa Barat*. Lawalata IPB, Bogor. (unpubl.)
 BACKER, C.A. & BAKHUIZEN van den BRINK Jr., R.C. 1964 (“1963”). *Flora of Java* 1: 165. Noordhoff,

- Groningen.
 BARCELONA, J. F., CO, L.L., BALETE, D.S. & BARTOLOME, N.A. 2009a. *Rafflesia aurantia* (Rafflesiaceae): A new species from Northern Luzon, Philippines. *Gard. Bul. Sing.* 61: 17–28.
 BARCELONA, J.F., PELSER, P.B., BALETE, D.S. & CO, L.L. 2009b. Taxonomy, ecology and conservation status of Philippine *Rafflesia* (Rafflesiaceae). *Blumea* 54: 77–93.
 BARKMAN, T.J., BENDIKSBY, M., LIM, S.H., MAT-SALLEH, K., NAIS, J., MADULID, D.A. & SCHUMACHER, T. 2008. Accelerated rates of flora evolution at the upper size limit for flowers. *Current Biology* 18: 1508–1513.
 DAVIS, C.C., LATVIS, M., NICKRENT, D.L., WARDUCK, K.J. & BAUM, D.A. 2007. Floral gigantism in *Rafflesiaceae*. *Science* 315:1812.
 JAFARSIDIK, Y. & MEIJER, M. (1985, “1983”) *Rafflesiaceae di Jawa*. *Bul. Kebun Raya Bogor* 6: 73–76.
 MAT-SALLEH, K. & LATIFF, A. 1989. A new species of *Rafflesia* and notes on other species from Trus Madi Range, Sabah (Borneo). *Blumea* 34: 111–116.
 MAT-SALLEH, K., MAHYUNI, R., SUSATYA, A. & VELDKAMP, J. F. 2010 *Rafflesia lawangensis* (Rafflesiaceae), a new species from Bukit Lawang, Gunung Leuser National Park, North Sumatra, Indonesia. *Reinwardtia* 13(2):159–165.
 MEIJER, W. 1998. *Rafflesiaceae*. *Flora Malesiana* I, 13: 1–42. Rijksherbarium / Hortus Botanicus, Leiden.

- SUSATYA, A., ARIANTO, W. & MAT-SALLEH, K. 2005. *Rafflesia bengkuuensis* (Rafflesiaceae), a new species from South Sumatra, Indonesia. *Folia Malays.* 6: 139–152.
- VELDKAMP, J. F. 2007. Some notes on the cultivation of *Rafflesia*. *Fl. Males. Bull.* 14: 50–53.
- VELDKAMP, J. F. 2009. Notes on the name of the *Tetrastigma* (Vitaceae) hosts of *Rafflesia* (Rafflesiaceae). *Reinwardtia* 13(1): 75–78.
- WIRIADINATA, H. 1993. *Patma raksasa (Rafflesia arnoldii) Rob. Brown. Puspa Langka Indonesia yang perlu dilestarikan*. Paper presented on Sarasehan sehari melestarikan alam dan meningkatkan kualitas lingkungan melalui cinta puspa dan satwa. Bogor 3 Nov. 1993. Puslitbang Biologi dan UPT Kebun Raya LIPI bekerjasama dengan KLH dan Ditjen PPHPA.
- WIRIADINATA, H. & ALAM, S. 1990. *Rafflesia arnoldii* a giant among flowers. *Voice of Nature* 84: 14–19.
- ZUHUD, E.A.M., HIKMAT, A. & JAMIL, A. 1998. *Rafflesia Indonesia*. Yayasan Pembinaan Suaka Alam dan Suaka Margasatwa Indonesia dan Laboratorium Konservasi Tumbuhan Jur. Konservasi Sumberdaya Hutan Fak. Kehutanan IPB, Bogor. 38 pp.

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