

A second new species of *Rafflesia* (Rafflesiaceae) from Panay Island, Philippines

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Abstract

Rafflesia lobata Galang & Madulid, is a new species from Panay Island, Philippines. It has small flowers similar to *R. manillana* but differs in having a lobed usually outcurved diaphragm which is almost white when fully opened. Diaphragm forms range from the more common five shallow lobes to uncommon 3 incurved lobes.

Key words: *Rafflesia*, *Rafflesia lobata*, Panay, Philippines

Introduction

Rafflesia R. Brown (Rafflesiaceae) is a genus of parasitic plants found in the Kra Isthmus of Thailand through West Malesia (Meijer 1997, Nais 2001). Meijer listed 13 species while Nais listed a total of 18 species for the genus. Recently one new species, *R. azlanii* Latiff & Wong was described from Peninsular Malaysia in 2003, and another from Sumatera, Indonesia, *R. bengkuensis* Susatya, Arianto & K. Mat-Salleh in 2005. In the Philippines three new species were recently described, namely: *R. speciosa* Barcelona & Fernando in 2002, *R. mira* Fernando & Ong, and *R. magnifica* Madulid, Tandang & Agoo in 2005. Previously only 2 species had been recorded from the Philippines: *R. manillana* Teschem. (1841) and *R. schadenbergiana* Goeppert (1884).

In April 2005 the first author made an expedition to Mt. Igtuog and Mt. Sakpaw in the northern section of the Central Panay Mountain Ranges in connection with his fieldwork observation of the Spotted Deer (*Cervus alfredi*). In the course of his exploration of the lowland primary forest he encountered a population of *Rafflesia* in Mt. Igtuog which composed of several plants of various ages and sizes. No newly opened flowers were seen but the plants were already black and had passed their blooming period while some buds appeared to be diseased. No collection of *Rafflesia* specimen was made during the visit.

In a follow up visit in September, 2005 another population of *Rafflesia* was encountered in Mt. Sakpaw, approximately 10 km away from Mt. Igtuog by the first author. In the site, 11 buds of various sizes and ages were counted. Eighteen flowers were seen, 4 males, 1 female and 13 of unknown gender. All of the flowers

were black and partly decomposed. The Mt. Igtuog population was composed of 72 buds of which 4 appeared diseased. Ten flowers were seen: 6 males and 4 unknown gender. Eight of the flowers were black and partly decomposed, but two were of late bloom. Three mature fruits were seen and one was ripe. Initial studies were made on the biology and distribution of the species and will be reported in a separate account. Collection of specimens were later made after securing a Gratuitous Permit by the first author from the Department of Environment and Natural Resources office in Region VI on June 21, 2006.

This species is the second to be recorded in the island of Panay, the first being *R. speciosa* Barcelona & Fernando reported in the southern section of the Central Panay Mountain Ranges in Antique and Iloilo.

***Rafflesia lobata* Galang & Madulid, sp. nov.**

A R. manillanae differt diaphragmate extrorsus curvato, perfecte aperto fere albo, lobis non profundis plerumque quinque vel raro quattuor, vel tribus in diaphragmate parum incurvato, manifestis etiam longe ante anthesin; ramentis brevibus albis, aliquibus extensis ad bases loborum perigonii; habitat praeterea in insula Panay, non (ut R. manillana) in Luzonia.

Type: Philippines, Panay Island, Antique Prov., Sebaste Municipality, Barangay Idio, Mt. Igtuog, June 24, 2006, *Galang et al. 001* (holotypus: PNH, spirit collection).

Mature buds 61-65 mm in diameter. *Flowers* 11-21 cm diameter, 6-9 cm high when expanded. *Perigone lobes* orbicular to oblong, 4-5 cm x 6-7 cm, **0.05 cm** thick at tip, gradually thickening to 0.625 cm at junction with diaphragm, brown, becoming darker brown with age then black; warts wet snow white, oval to oblong-shaped, 1 mm x 3 mm, slightly raised, to 0.09 cm, occasionally with raised linear warts across the length. Perigone tube covered with variously-shaped, short ramenta. *Diaphragm* usually outcurved with 5 or 4 lobes, or with 3 lobes which are incurved, diaphragm opening to 4.5 cm, lobes 1 x 3.5 cm, half moon or crescent-shaped, the lower part adnate to the perigone tube, with roundish depressions. Only host plant observed is *Tetrastigma tuberculatum* (Vitaceae), a woody vine. Most of the healthy buds of *R. lobata* are attached to the lower part of the vine where it touches the ground although some buds can be found attached to the stems as high as 15 meters above the ground. Galang, R. et al. 001, and 002, Specimens Examined: Philippines: Mt. Igtuog, Barangay Idio, Municipality of Sebaste, Province of Antique, June 24, 2006, *Galang, R. et al. 001 & 002*; Mt. Igtuog, Barangay

Idio, Municipality of Sebaste, Province of Antique June 26, 2006, underneath, surface covered with numerous, small, creamy white warts or windows. *Disk* dome-shaped, to 3.3 cm diameter; column 1.5 cm above the base of the perigone tube; processes 7-14, elongate, to 0.3 cm tall on central disk and 0.4 cm towards the rim of central disk, processes to 0.1 cm thick and 0.2 cm wide, top of processes with numerous fine bristles; perimeter of disk with numerous small convex bumps with numerous fine bristles 0.1 cm long, annulus diameter to ca. 5 cm, interior covered by thick, black, spear shaped bristles, to 0.01 cm long. *Ramenta* to 0.05 cm diam. x 0.1 cm high, numerous on perigone tube extending to the inner side of diaphragm, lower ramenta columnar with funnel shaped, multi-lobed top to 0.2 cm high 0.125 cm diam. Middle to upper ramenta pustulate, to 0.1 cm high with 0.025 cm, multi-lobed crown. Numerous radial ridges radiating from the annulus exterior to the inner half of diaphragm. *Male flowers* with 10-11 anthers; anthers brown, 0.53 cm diameter, anther cavity on underside of disk 1 cm wide with densely fine bristles; anther cavity between the base of the column and annulus interior is 1.2 cm x 0.75 cm radial, each anther cavity has rims and radiating ridges on the center lined with thick 0.01 cm long bristles. *Female flowers* with ovary to 4 cm wide at apex, 1.0 cm high, annulus indistinct, and without grooves or cavities, lower side of disk with few minute, scattered papillae on the stigmatic zone.

Note: The first author saw the fruits in the field but it was not possible to preserve them at the time. However, based on those observations, the fruit was 57-65 mm diameter, black, with slightly rough outer cover; with creamy white flesh, slightly pungent. *Seeds* were orange, approximately 123,600, oval shaped, 0.05 cm x 0.025 cm, on edge of vertical columned placenta.

Distribution and ecology: Philippines, Panay Island, northern section of the Central Panay Mountain Ranges. On the western slope of Mt. Sakpaw and eastern slope of Mt. Igtuog, Barangay Idio, Municipality of Sebaste, Province of Antique. In April to June 2006, a site in Barangay Maadios and 4 sites in Barangay Idiacacan, Municipality of Pandan, Province of Antique were observed and verified by the first author to have small populations with fresh blooms. Elevation ca. 400-800 m above sea level, mostly in gullies, on forest floor or attached to vines in primary lowland rainforest. The species occasionally produces one or few flowers all year round. From February to June appear to be the optimal flowering period due to numerous flowers observed in 2006.

Galang, R. et al. 003 & 004; Mt. Sakpaw, Barangay Idiacacan, Municipality of Pandan June 28, 2006, *Galang, R. et al. 005 & 006*. The specimens are deposited at the Philippine National Museum. All flowers are in spirit collection.

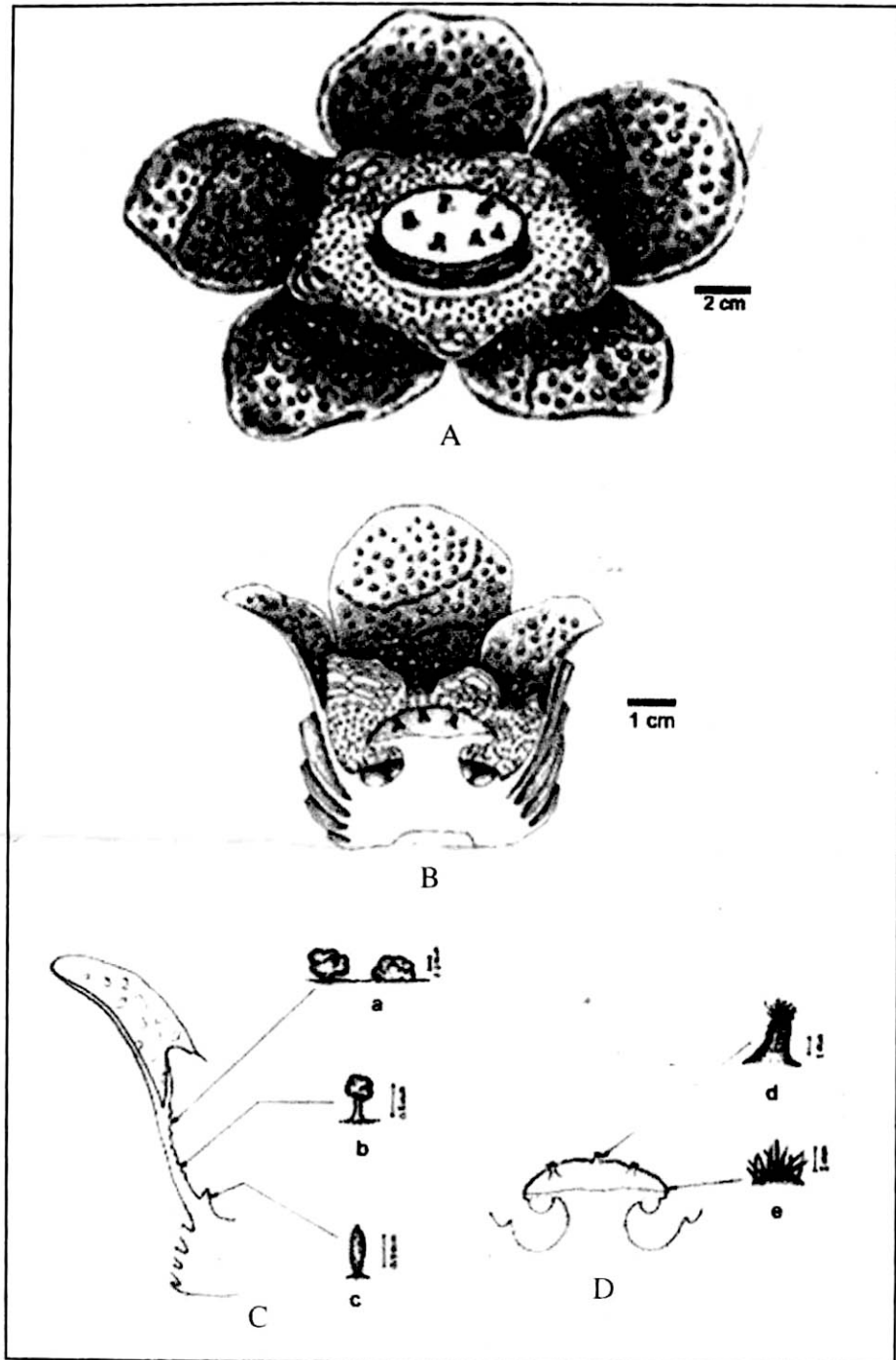


Plate 1: *Rafflesia lobata* A. Fully opened flower ; B. Newly opened bud of *R. lobata*; C. Longitudinal section of perigone tube: a) upper ramemta, b) lower ramemta, c) bristles of annulus interior; D. Longitudinal section of disc. d) process e) brities of disk rim [Drawing by Abner de Guzman]

Notes: *Rafflesia lobata* is similar to *R. manillana*: in flower diameter size which ranges from 11 to 21 cm for the former and 15 to 20 cm for the later; in perigone lobe colour both species are of brown to light reddish brown; and both species ramenta are similar in structure and length. The differences are: in diaphragm, *R. lobata* has white colour on the outside and is lobate. Most flowers have 5 shallow out-curved lobes; flowers with 4 shallow out-curved lobes were also observed but rare. Three-lobed flowers were also rare but interestingly have slightly incurved diaphragm. *R. manillana* has brown and classical incurved diaphragm like all *Rafflesia* species. The presence of this lobate diaphragm which is out-curved in most flowers observed in all 7 currently known different populations strongly suggest that it is highly unlikely that these populations are a rare mutant form of *R. manillana*. Preliminary parsimony analyses by Todd Barkman based on ITS sequence data suggests that *R. lobata* is distinct from *R. manillana* and *R. speciosa* but forms a clade with them.

The presence of lobate diaphragm which is generally outcurved on this new species means that the description of the genus *Rafflesia* requires an amendment to include species with an outcurved lobed diaphragm, like *R. lobata*, not just species with incurved diaphragm.

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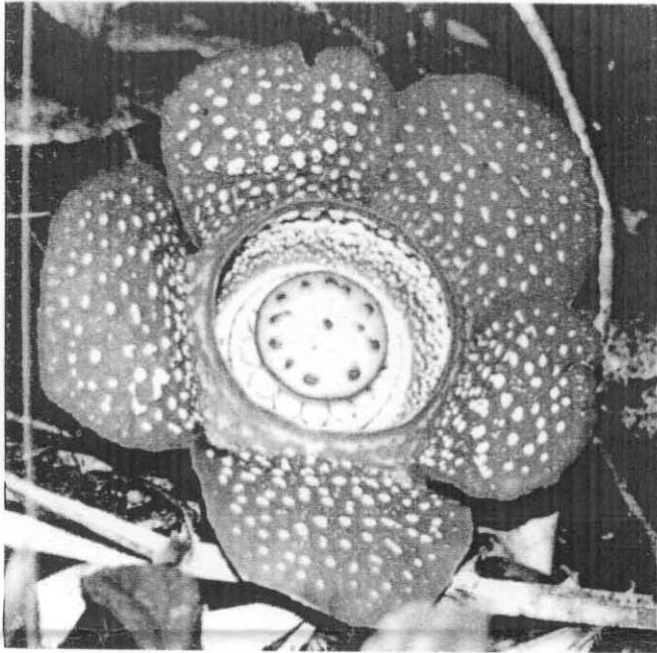


Plate 2: *Rafflesia manilana* Teschem.

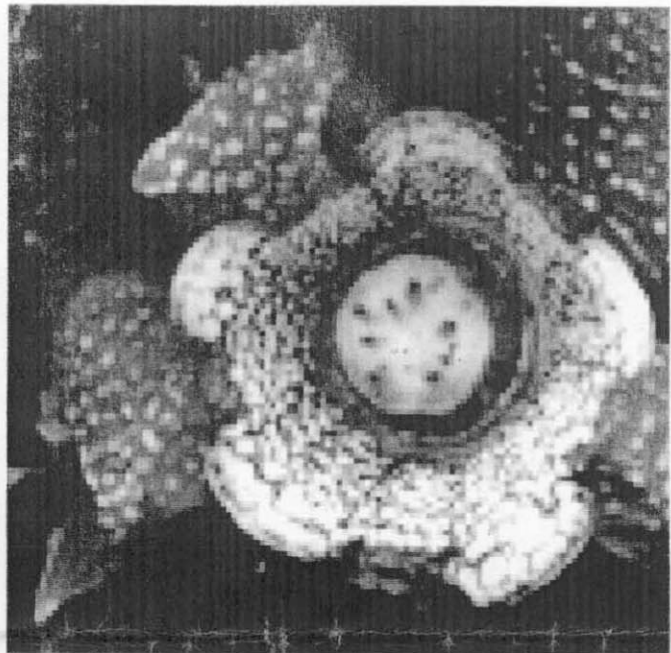


Plate 3: *R. lobata* Galang & Madulid, sp. nov.

Plate 4: *R. lobata*, habit at type location [all photos of the new species copyright R. Galang]



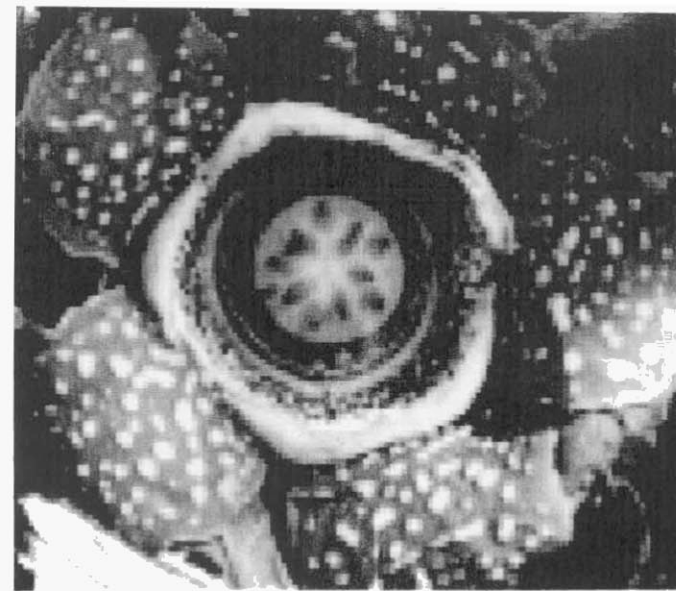


Plate 5: *R. lobata*, 3-lobed flower

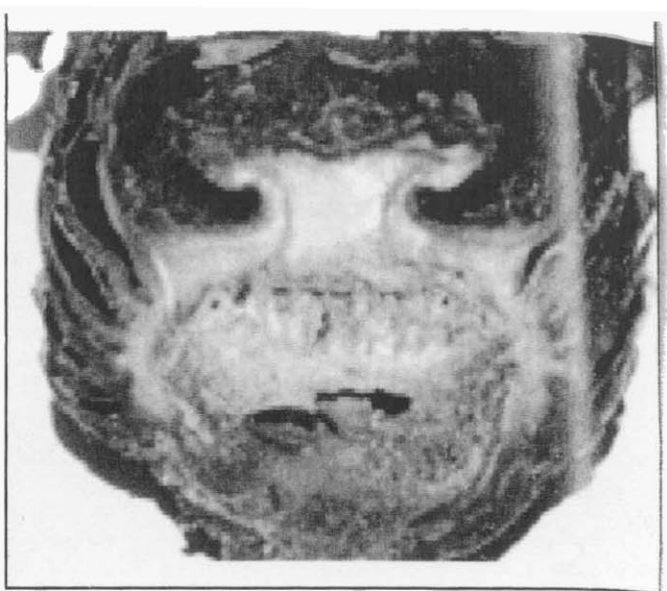


Plate 8: *R. lobata*: longitudinal section of male flower

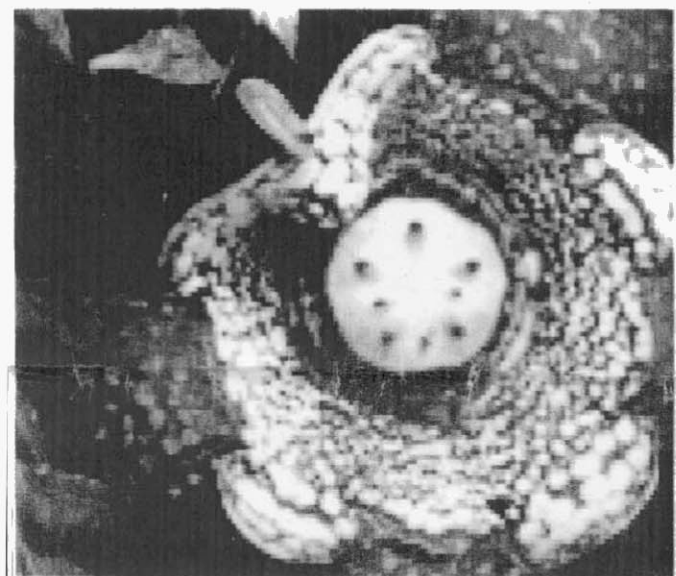


Plate 6: *R. lobata*, 4-lobed flower

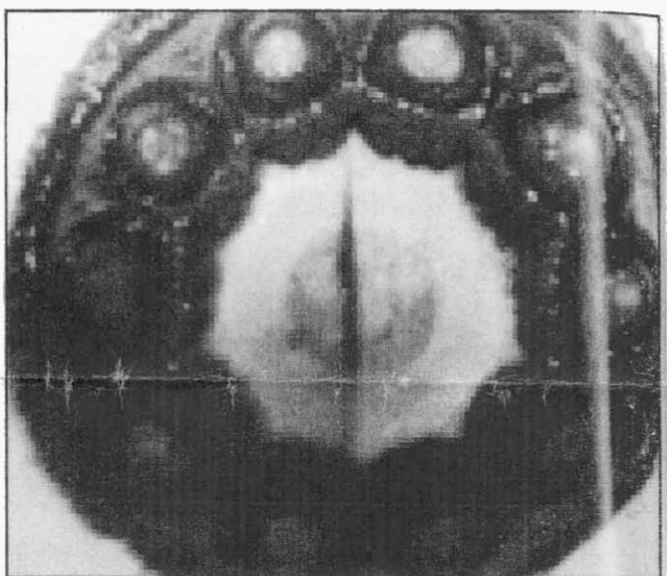


Plate 9: male flower showing anther arrangement

Plate 7: *R. lobata*, flowers in decay.

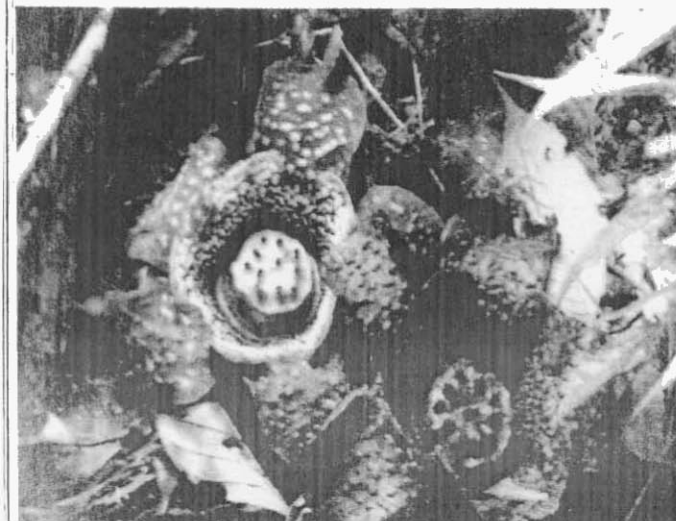


Plate 10: longitudinal section of female flower

