

Rafflesia panchoana (Rafflesiaceae), a New Species from Luzon Island, Philippines

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Abstract. A new species, *Rafflesia panchoana* Madulid, Buot & Agoos, is described from Mt. Makiling, Luzon Island, Philippines. It is similar in size to *R. manillana* Teschem. but differs in having an upright or slightly inclined diaphragm, smaller warts on the perigone lobes, elongated or stretched windows on the underside of the diaphragm, and bristles on the rim of the annulus.

Keywords: *Rafflesia panchoana*, *Rafflesia manillana*, Mt. Makiling, threatened plant, endemic plant

INTRODUCTION

Rafflesia R.Br. is a genus known for having the largest flowers in the world. The flowers reach 1 m in diameter, orange to reddish-brown in color, and have five perigone lobes flecked with white warts. The perigone tube is usually lined with ramenta and extends to an upright or incurved diaphragm. At the center of the tube is a disk with processes on the upper surface and a stigmatal zone or anthers on its underside.

To date, there are 26 species of *Rafflesia* known worldwide, eight of which are found

only in the Philippines. The rediscovery of *Rafflesia manillana* in its type locality in Basey, Samar, in May 2007 enabled the present authors to examine the details of the flowers and buds of this enigmatic species. It was the first time that the open flowers of *R. manillana* were seen and described as the early authors such as J.E. Teschemacher [1, 2] and R. Brown [3] had only seen the buds. Based on the detailed investigation of the specimens the present authors came to the conclusion that *R. manillana* from Basey is a distinct species and should not be confused with the other small-diameter *Rafflesias* in Luzon [4].

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This led the authors to closely re-examine the specimens commonly referred to as *R. manillana* but are not from Samar. Comparison of the morphological characters of the specimens from Mt. Makiling and Basey, Samar, showed marked differences in the two provenances. The *Rafflesia* from Mt. Makiling is here described as a new species.

TAXONOMIC TREATMENT

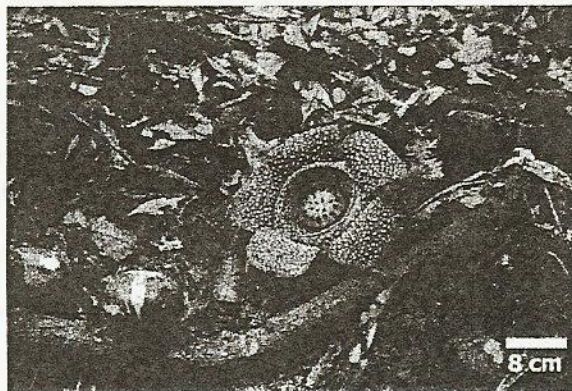
Rafflesia panchoana Madulid, Buot & Agoo, *sp. nov.*

Rafflesiae manillanae similis in magnitudine fenestrarum praesentia, sed diaphragma angusta sursum curvata vel paulo incurvata, columnae basi et annuli summo setis planis

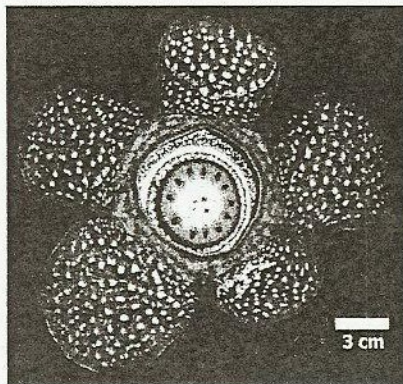
differt. — Typus: W.H. Brown *s.n.* (*Sp. Blanc.* 535)(holo US No. 0090412, bar code 52509), Philippines, Laguna, Mt. Makiling, 1914. Figures 1 and 2.

Rafflesia manillana auct. non Teschem.: [5] W.H. Brown (1912) 209-226; [6] (1919) 41, 412; [7] Merrill (1918) 135; [8] (1923) 120-121; [9] Pancho (1993) 312-314; [10] Meijer (1997) 27; [11] Madulid (2000) 39-40; [12] Nais (2001) 154-156; [13] Fernando *et al.* (2004) 272; [14] Fernando and Ong (2005) 264-265.

Open flower 14-24 cm wide, 7-11 cm high (with cupule). *Cupule* 2-3 cm high, 6-7 cm wide. *Bracts* semi-orbicular, in 3-5 whorls, outer whorl 2 x 3 cm, middle whorl 3.5-5 cm, inner whorl 4-6 x 6 cm. *Perigone lobes* semi-orbicular, 6-10 x 7-9 cm, at least 10 warts across wid-



A



B

Figure 1. *Rafflesia panchoana* Madulid, Buot & Agoo. A. Open flower buds and host vine (US No. 0090412, bar code 52509); B. Close-up of open flower (Photo by I.E. Buot Jr. and D.N. Tandang)

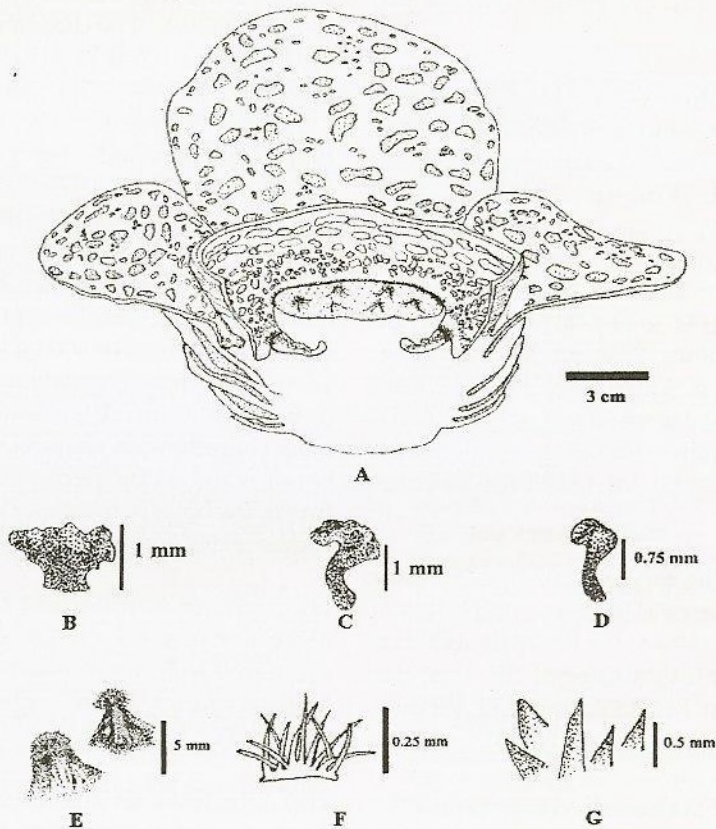


Figure 2. *Rafflesia panchoana* Madulid, Buot & Agoo. a. Longitudinal section of flower; b. ramenta on upper part of perigone tube; c. ramenta on middle part of perigone tube; d. ramenta on lower part of perigone tube; e. processes; f. hairs on rim of disk; g. bristles on the base of column and rim of annulus. (US No. 0090412, bar code 52509)

est part, widely spaced, 2-3 x 2-5 mm. *Diaphragm* upright or inclined towards the center, 10-11 cm across, 2-2.5 cm broad, opening to 7.5-8.5 cm across, upper surface same color as perigone lobes when mature, with small warts, as big as those on the perigone lobes, close to widely spaced, sometimes with depressions or impressions of the warts of the lobes from the bud; lower surface with windows, windows in 3 rows, lower row 3-5 x 5-6 mm, middle row 5 x 7-10 mm, upper row 2-5 x 10-15 mm, somewhat coalesced. *Perigone tube* 4-4.5 cm high, to 10 cm wide, ramenta on lower part of tube to 2 mm long, stalked with round top, middle part to 2 mm long, stalked with truncate to round top, upper part to 1.5 mm long, very broad top. *Disk* to 6 cm diam., 1-1.3 cm high, rim 2-3 mm high, slightly raised, with short bristles, processes 11-24

(10-14 outer + 7-10 inner), to 5 mm high and conical (in males) or broad and short (in females), hairy. *Male flower* with anthers 14-18, 4-5 x 5-8 mm, anther groove 7.5-8 mm wide, hairy along the margins, pollen mass to 3 mm wide, column 0.8 to 1 cm high, 2.5-3 cm diameter; shallowly grooved connecting to cavities on the base of the column; base of the column 5.5-6.5 cm diam., cavities 14-16, to 1.5 x to 2.8 cm, with bristles on the margins of the cavities; annulus rim with bristles. *Female flower* with stigmatic zone to 1 cm broad, papillose; column to 2.5 cm diam.; base of the column to 6 cm diam., smooth, with very shallow grooves and shallow depressions at the edges; annulus with bristles; ovary 1-1.2 cm high, 3-3.5 cm wide.

Local Name – Malabo-o (Tag.)

Distribution – Luzon Island: Laguna, Mt. Makiling.

Habitat & Ecology – Lowland evergreen rainforest at low to medium altitudes. The host plant is *Tetrastigma leucostaphylum* (Dennst.) Alston ex Mabb. (Vitaceae). Flowering from February to May.

Specimens examined – W.H. Brown *s.n.* (*Sp. Blanc.* 535) (holo U.S. No. 0090412, bar code 52509), Philippines, Laguna, Mt. Makiling, 1914; Gates *s.n.* (CAHUP 982), Mt. Makiling, 8 February 1913; Pancho *s.n.* (CAHUP 9927), Mt. Makiling, March 1952; Price 684 (CAHUP 17536, 19674, 19673), Mt. Makiling, 1 February 1970.

Etymology – The species is named in honor of Professor Juan V. Pancho, noted botanist from the University of the Philippines at Los Baños, Laguna and author of the Vascular Flora of Mount Mt. Makiling and Vicinity (Luzon: Philippines), Part 1 (1983).

Conservation Status – Endangered. This species is, so far, known only in the forests of Mt. Makiling, a protected area, and is rather restricted in its distribution. Reports of the species occurring in other places in Luzon have yet to be verified. Habitat destruction and landslides are the threats to the species.

RESULTS AND DISCUSSION

Rafflesia panchoana belongs to the group of small-diameter *Rafflesias* in the country together with *R. manillana* Teschem., *R. baletei* Barcelona & Cajano, *R. lobata* Galang & Madulid, and *R. banahawensis* Madulid, Villarriba-Tolentino & Agoo. The open flower in this group ranges from 13-20 cm. In general morphology, *R. panchoana* is most similar to *R. manillana* and *R. lobata* but is distinguished by the shape and width of the diaphragm, shape of windows on the underside of the diaphragm, density and shape of warts on the perigone lobes, and hairs or bristles on the annulus. The diaphragm of *R. panchoana* is narrower, about 2 to 3 cm from the base to the margin, upright to slightly

incurved and with a wider opening compared to *R. manillana*. The diaphragm of *R. lobata* on the other hand is distinctly shallowly lobed. W.H. Brown [5] mentioned that individuals with upright and closed incurved diaphragms are both observed in the population of “*R. manillana*” (here referred to as *R. panchoana*) in Mt. Makiling. He remarked that this could be part of the variation of the species. It is, however, difficult to ascertain at this time if such variations are influenced by genetic or environmental factors. This observation requires an examination of more specimens to determine the extent of variation of other characters, i.e. shape of windows, number of warts on the perigone lobes, and nature of the hairs or bristles on the annulus, to compare or delineate it from *R. panchoana*.

The warts of *R. panchoana* are smaller and more densely set on the perigone lobes compared to those of other small-diameter *Rafflesia* species. A few white specks are also scattered on the lobes.

The windows at the underside of the diaphragm of *R. panchoana* are elongated or stretched like those of *R. banahawensis* in contrast with those of *R. manillana* which are almost round. The windows in *R. panchoana* are easily seen from top view since the diaphragm is relatively open, unlike those of *R. manillana* which are hidden from view by the incurved diaphragm.

The annulus, which is found at the base of the column and floor of the perigone tube, has short bristles at the surface, extending inwards, though sparsely, lining the cavities at the base of the column. This character of the annulus is diagnostic of *R. panchoana* and is markedly different from those of *R. manillana*, which have numerous small tubercles or round knobs on the annulus and base of the column.

While the morphology of *R. panchoana* has been discussed in this paper there are still other studies to be made to fully understand this species. W.H. Brown’s account of the flower biology of the species and its host vine is detailed and comprehensive [5]. However,

aspects on the ecology, pollination, anatomy, chemistry and molecular character of the species and others need to be studied further. The distribution of the existing populations of this species in Mt. Makiling should be documented, mapped and marked on the ground. Appropriate conservation action plans must be undertaken to prevent the species from getting extinct.

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