

A critical review and taxonomic assessment of *Rafflesia lagascae* (Rafflesiaceae), a superfluous and illegitimate name

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Abstract

The name *Rafflesia lagascae* Blanco has been subject to misinterpretation and incorrect taxonomic evaluation by many authors including Merrill (1918) who regarded it (and *R. philippensis*) as a synonym of *R. manillana* Teschem. (Madulid & Agoo 2015a). The name was resurrected by Pelsner et al. (2013) as the earlier correct name of *R. panchoana* Madulid, Buot & Agoo, but this is questioned as supporting discussion of the case was not provided. This present paper reveals that *R. lagascae* Blanco is in fact a duplication of *R. philippensis* Blanco. As such, *R. lagascae* is a superfluous and illegitimate name and should be rejected following the International Code of Nomenclature for Algae, Fungi and Plants. The correct name of the *Rafflesia* in Mt. Makiling and other parts of Luzon is *R. panchoana* Madulid, Buot & Agoo.

Keywords: Flora de Filipinas, nomenclatural analysis, Philippine *Rafflesia*, *Rafflesia panchoana*, *Rafflesia philippensis*

Introduction

The genus *Rafflesia* R.Br. is unique in having the largest solitary flower among the seed plants in the world. It is found in Southeast Asia, from Thailand to west and central Malesia. There are a total of 42 species of *Rafflesia* currently known to science. From this number, 14 species are recorded in the Philippines and are endemic to the country (Malabrigo et al. 2023). Interestingly, the Philippines is considered one of the centers of diversity for the genus *Rafflesia* in the Malesian region. Unfortunately, being narrow endemics, all of the *Rafflesia* species in the Philippines are highly threatened (Madulid & Agoo 2015a, 2015b; Malabrigo et al. 2023) because of habitat destruction and indiscriminate cutting of its host vines. For example, *R. magnifica* Madulid, Tandang & Agoo is listed as critically endangered in the Red List of Threatened Species by the World Conservation Union (IUCN).

At present, the taxonomy of Philippine *Rafflesia* is not clearly defined and needs critical revision as researchers differ in their species concepts and nomenclatural application. A case in point is the two species, *Rafflesia lagascae* Blanco and *R. philippensis* Blanco, which are described in the second edition of Fr. Manuel Blanco's Flora de Filipinas segun el sistema de Linneo in 1845. Confusion in the interpretation of Blanco's *Rafflesia* species arose with the publication of *R. philippensis* in the main body of the book (p.565) and *R. lagascae* in the Suplemento, here referred to as the Supplement (p. 595). The 14 taxa in the Supplement, including *R. lagascae*, were draft manuscripts of Blanco which were purposely excluded from the main text. However, these were appended by Fr. Antonio Llanos as a Supplement. The case was partly discussed in

Agoo et al. (2015) but, nevertheless, this needs a detailed explanation covering the history, taxonomy, and nomenclature of *R. lagascae*, together with *R. philippensis*. This is the subject of the present investigation.

Materials and Methods

A thorough review and analysis of the taxonomic history of Blanco's *Rafflesia* species were conducted by referring to the original publication of Flora de Filipinas, second edition (1845), by consulting pertinent publications (see list in Literature cited), and by examining voucher specimens which include the following: *W.H. Brown* s.n., Sp. Blancoanae 535 (holo US [US 0090412, barcode 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). Numerous *Rafflesia* specialists and nomenclature experts were also consulted (see Acknowledgments).

Results and Discussion

Rafflesia philippensis Blanco

The taxonomy and nomenclature of *R. philippensis* Blanco are complicated and the subject of a separate investigation by Madulid & Agoo (2015a). Analysis of the protologue of *R. philippensis* (Blanco 1845) showed that it is composed of two gatherings collected in separate places at different dates by different individuals. Based on the protologue, the specimens came from two provenances, namely (1) Mt. Majayjay (in Laguna Province), which is a male specimen collected, observed, and recorded by Iñigo de Azaola; and (2) Basey "Leite" (now Samar), which is a female specimen collected and recorded by Fr. Pedro Navarro. Unfortunately, these specimens were not preserved similar to the rest of Blanco's specimens described in the Flora (Merrill 1918).

The specimen from Mt. Majayjay (Laguna) was not preserved and cannot be properly identified or ascertained from the brief description which lacks diagnostic descriptions required for the definite identification of *Rafflesia* species (Meijer 1984; Beaman et al. 1988; Mat-Salleh 1991; Nais 2001;

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Date Submitted: 26 June 2023

Date Accepted: 14 January 2024

Date Published: 31 January 2024

Malabrigo et al. 2023). Meanwhile, further assessment shows that the specimen from Basey, Samar matches the species earlier named as *R. manillana* Teschem. collected in the same locality by the English naturalist Hugh Cuming (Madulid & Ago 2007).

Rafflesia lagascae Blanco

As specified in the protologue of *R. lagascae*, Blanco transcribed the field notes of Ignacio de Azaola who described the flower from “Monte de Majajai” (Majajay) on April 22, 1840. “The notes of the author on these rare and wondrous plants were transcribed” (Galende et al. 1993). At the end of the protologue, it mentioned that: “Other smaller ones were sent to me [Blanco] from Leite (Leyte), similar to it”. These “smaller ones” were later identified by Blanco in the protologue of *R. philippensis* as the female flower. *R. lagascae* was later reviewed and revised by Llanos and Fernandez-Villar (1880) in the Novissima Appendix of the third and grand edition of the Flora de Filipinas. In the revision, *R. lagascae* was reduced as a synonym of *R. patma* Bl. (now *R. horsfieldii* R.Br.) which is incorrect as the latter species occurs only in West Java (POWO 2023) and the western coast of Lampung, Sumatra (Susatya, pers.comm.). Llanos and Fernandez-Villar (1880) also reduced *R. philippensis* (“ex parte ob description”) as a synonym of *R. cumingii* R.Br. However, this is a superfluous name and an illegitimate name according to Mabberley (1999) because its type is the same as that of *R. manillana*. Furthermore, the authors reduced the description of *R. philippensis* “*parte ob descriptionem floris masculi*” to *Brugmansia zippelii* Bl. [now *Rhizanthus zippelii* (Bl.) Spach] which is also erroneous because this species occurs only in Myanmar and W. Malesia (POWO 2023).

Moreover, in the revision of Malesian Rafflesiaceae, Meijer (1997) regarded *R. lagascae* as “most likely a nomen nudum”. However, this is incorrect as there is a description of the species in the Flora albeit brief and incomplete. Merrill (1905, 1918, 1923) later revised Blanco’s *Rafflesia* species and reduced both *R. philippensis* and *R. lagascae* to synonyms of *R. manillana* Teschem. The *Rafflesia* from Mt. Makiling was then known as *R. manillana*. However, Merrill’s revision was erroneous because the species in Mt. Makiling is actually a previously undescribed new species, which was later identified to be *R. panchoana* Madulid, Buot & Ago (Madulid et al. 2007).

Up until 2002, there were only two species of *Rafflesia* recorded in the Philippines, namely *R. manillana* from Samar first described in 1842 and *R. schadenbergiana* Góepp. from Mt. Apo in Davao described in 1885. The third *Rafflesia* species, *R. speciosa* Fernando & Barcelona, was discovered in Aklan in 2002, which is 117 years after the second species of *Rafflesia* was described. From then on, numerous new *Rafflesia* species were discovered in the Philippines (Nickrent 2010; Malabrigo et al. 2023). To date, there are 14 species recorded in the country. In the past years, both *R. lagascae* and *R. philippensis* were consistently but incorrectly cited in the literature as synonyms of *R. manillana* following Merrill’s classification.

Rafflesia philippensis and *R. lagascae* compared

The protologues of *R. lagascae* and *R. philippensis* (i.e., specimen from Mt. Majajay, Luzon, not Basey, Samar) state

that the specimens were both collected by Iñigo de Azaola. Although the locality was not specified, it can be inferred that Azaola collected these from the boundary of Majajay and Liliw (Laguna Province), where he also collected *Vanilla majajensis* Blanco (= *V. ovalis* Blanco in main text, now known as *V. decesareae*; Ormerod & Cootes 2013). The date of collection of *R. philippensis* according to the protologue was April 22, 1840. The date is not specified in the protologue of *R. lagascae*, but Pelsner et al. (2013) stated that it was collected on “April 22, 1840 fide Solms-Laubach 1891”.

In earlier studies by two noted foreign experts in *Rafflesia* (Hieronymus 1885; Solms-Laubach 1891), it was concluded that *R. lagascae* is the same taxon as *R. philippensis*. In the Supplement [of Blanco’s Flora de Filipinas] that was completed only after Blanco’s death, *R. lagascae* was added, which mainly seems to refer to the form found by Azaola in Mt. Banahao (Hieronymus 1885). However, he correctly drew attention to the fact that Blanco probably had left out *R. lagascae* in the main text which he edited himself because he considered it to be identical with *R. philippensis*. The intentionally suppressed description of the former may have been found after his death among his manuscripts and published in the “Supplement” (Solms-Laubach 1891).

Neotypification of *Rafflesia lagascae*

As *R. lagascae* had no holotype, Pelsner et al. (2013) designated a neotype based on their own collection: “Philippines, Luzon: Quezon Prov. Dolores Municipality, Barangay Kinabuhayan, Bangkong Kahoy valley, Mounts Banahaw-San Cristobal Protected Landscape, ca 700 m, 3 April 2013, *Barcelona 3819 with Pelsner (CHR)*”. However, they did not explain the basis for their choice of the neotype. The neotypification of *R. lagascae* is considered vague and unjustified since the authors made no mention of the protologue and how the characters of the neotype best fit the original description. Furthermore, the protologue of *R. lagascae* lacks important diagnostic characteristics necessary to establish its specific identity.

Conclusion

Following the International Code of Nomenclature for Algae, Fungi and Plants (ICN) Shenzhen Code, Chapter VII, Art 52.1, which states that: “A name, unless conserved (Art. 14), protected (Art. F.2), or sanctioned (Art. F.3), is illegitimate and is to be rejected if it was nomenclaturally superfluous when published, i.e., if the taxon to which it was applied, as circumscribed by its author, definitely included the type (as qualified in Art. 52.2) of a name that ought to have been adopted, or of which the epithet ought to have been adopted, under the rules (but see Art. 52.4 and F.8.1).”, *R. lagascae* is a superfluous and illegitimate name and should be rejected because its type refers to the same type as *R. philippensis* published in the main body of the Flora. Moreover, Chapter 2 (Typification) Recommendation 9B.1 of ICN states that: “In selecting a neotype, particular care and critical knowledge should be exercised because there is usually no guide except personal judgement as to what best fits the protologue; if this selection proves to be faulty it may result in further change”. Even if *R. lagascae* is neotypified, its designation is not a justification for the legitimacy of the species name. Furthermore, no morphological description of the neotype

was provided to claim that it best fits the protologue of *R. lagascae*. Thus, the resurrection of *R. lagascae* as the “earlier, valid name” of *R. panchoana* in Mt. Makiling by Pelsner et al. (2013, 2017) is unjustified.

Additionally, the resurrection of *R. philippensis* by Barcelona et al. (2009) as the “earlier valid name” of *R. banahawensis* is also incorrect (Madulid & Agoos 2015a) and should be rejected. This is because the species name is ambiguous being based on two separate collection dates, by two different individuals, and in two separate localities.

Meanwhile, the collection from Samar matches *R. manillana* earlier described by Teschemacher (1842a, 1842b) from the same locality but which publication Blanco failed to consult.

Therefore, the correct citation for *R. lagascae* should be: *Rafflesia lagascae* M. Blanco, Flora de Filipinas Ed. 2, Suppl. 595 (1845), nom.superfl. (nom.illegit.). The name has no botanical standing since it cannot be placed as a synonym of *R. manillana*. In Merrill’s classification of botanical names (Merrill 1923), *R. lagascae* falls under “doubtful species” or species dubium. The correct name of the *Rafflesia* species in Mt. Makiling and other parts of Luzon formerly identified as *R. lagascae* and *R. manillana* is: *Rafflesia panchoana* Madulid, Buot & Agoos, Acta Manilana 55: 43-47 (2007). This name is also recognized by Malabrigo et al. (2023).

Acknowledgements

We thank Prof. P. van Welzen (NHN and Naturalis Biodiversity Center, Department of Botany, the Netherlands) for commenting on an earlier draft of the manuscript. Additionally, we thank the following: André Schuiteman (Royal Botanic Gardens, Kew) who translated the Solms–Laubach (1891) article on *R. lagascae* from German to English. Dr. Kathleen Gutierrez (Department of History, UCLA at Santa Cruz) helped in our literature search in Spain. Dr. George Argent† (Royal Botanic Gardens, Edinburgh, UK), Prof. Agus Susatya (University of Bengkulu, Sumatra, Indonesia), Prof. Emeritus Dato’ Abdul Latiff Mohamad (University Kebangsaan Malaysia), and Dr. Irineo Dogma, Jr. (University of Santo Tomas Graduate School, Manila) provided valuable comments on the manuscript. Lourdes Caspe assisted in editing and proofreading the draft of the manuscript. Also, we acknowledge the help of the directors of the National Museum of the Philippines, University of the Philippines Los Baños Museum of Natural History, University of Santo Tomas Library Rare Book Collections, U.S. National Herbarium, Smithsonian Institution, and Singapore Botanic Gardens for allowing access to their botanical resources.

Literature Cited

Agoos, E.M., D.A. Madulid & I. Buot Jr., 2015. A critical analysis of Blanco’s *Rafflesia* species in the Philippines. In: Book of Abstracts, International Symposium on Indonesian Giant Flowers. 14–16 September 2015. Bengkulu, Sumatra, Indonesia.

Barcelona J.F., P.B. Pelsner, D. Balet & L.L. Co, 2009. Taxonomy, ecology, and conservation status of Philippine *Rafflesia* (Rafflesiaceae). *Blumea*, 54: 77–93.

Beaman R., P.J. Decker & J. Beaman, 1988. Pollination of *Rafflesia* (Rafflesiaceae). *American Journal of Botany*, 75(8): 1148–1162.

Blanco, M., 1845. Flora de Filipinas, Segun el Sistema Sexual de Linneo. Segunda impresion, corregida y aumentada por el mismo autor. Imprenta de D. Miguel Sanchez, Manila.

Galende P., P. Santiago, D.A. Madulid & R.M. del Rosario, 1993. Blanco, M. Flora de Filipinas 4th Edition, 3 Vols. San Agustin Convent, Intramuros, Manila.

Hieronymus, G., 1885 ‘1884’. Ueber *Rafflesia schadenbergiana* (Göppert). Ein Beitrag zur Kenntnis der Cytinaceen von G. Hieronymus. Breslau. Reprinted in Bull. Intern. Bot. Horticult. St. Petersburg. (1884, published 1885) 35–36 and as Ueber eine neue, von Dr. A. Schadenberg und O. Koch auf Süd-Mindanao entdeckte Art der Gattung *Rafflesia*. *Gartenflora*, 34(1885): 3–7, t. 1177.

Llanos, A. & C. Fernandez-Villar, 1880. Fragmentos de Algunas Plantas de Filipinas, (Being part of Novissima Appendix – 1880-1883) In: Blanco, M. Flora de Filipinas segun el sistema sexual de Linneo, ed. 3, Tomo 4:174. Plana y Cia, Manila.

Mabberley, D.J., 1999. Robert Brown on *Rafflesia*. *Blumea*, 44(2): 343–350.

Madulid, D.A. & E.M.G. Agoos, 2007. On the identity of *Rafflesia manillana* Teschem. (Rafflesiaceae). *The Philippine Scientist*, 44: 57–70.

Madulid D.A. & E.M.G. Agoos, 2015a. A critical review of the taxonomic status of *Rafflesia philippensis* Blanco (Rafflesiaceae) from the Philippines. *Philippine Journal of Systematic Biology*, 9: 1–9.

Madulid, D.A. & E.M. G. Agoos, 2015b. Conservation of *Rafflesia* species in the Philippines. In: Book of Abstracts, International Symposium on Indonesian Giant Flowers. 14–16 September 2015. Bengkulu, Sumatra, Indonesia.

Madulid D.A., I.E. Buot & E.M.G. Agoos, 2007. *Rafflesia panchoana* (Rafflesiaceae), a new species from Luzon Island, Philippines. *Acta Manilana*, 55(1): 43–47.

Malabrigo, P., A. Tobias, J. Witono, S. Mursidawati, A. Susatya, M.Y. Siti-Munirah, A. Wicaksono, R. Ralhandhany, S. Edwards & C. Thorogood, 2023. Most of the world’s largest flowers (genus *Rafflesia*) are now on the brink of extinction. *Plants, People, Planet*, 2023: 1–16. doi: 1002/ppp3.10431.

Mat-Salleh, K., 1991. *Rafflesia*: Magnificent Flower of Sabah. Borneo Publishing Company, Sabah.

Meijer, W., 1984. New species of *Rafflesia* (Rafflesiaceae). *Blumea*, 30: 209–215.

Meijer, W., 1997. Flora Malesiana: Revision of Families: Rafflesiaceae 13. Rijksherbarium, Hortus Botanicus, Leiden. pp. 1–41.

Merrill, E.D., 1905. A Review of the Identification of the Species Described in Blanco’s Flora de Filipinas. Department of the Interior, Bureau of Government Laboratories, Bureau of Public Printing, Manila.

Merrill, E.D., 1918. Species Blancoanae: a Critical Revision of the Philippine Species of Plants Described by Blanco and by Llanos. Department of Agriculture and Natural Resources, Bureau of Science, Bureau of Printing, Manila.

Merrill, E.D., 1923. An Enumeration of Philippine Flowering Plants: Rafflesiaceae 2: 120–121. Bureau of Printing, Manila.

- Nais, J., 2001. *Rafflesia* of the World. Sabah Parks, Kota Kinabalu, Malaysia.
- Nickrent, D.L., 2010. *Rafflesia* in the Philippines: An era of discovery. *Haustorium (Parasitic Plant Newsletter)*, 57: July 2010.
- Ormerod D.P. & J. Cootes, 2013. Leafy *Vanilla* species of the Philippines. *Orchideen Journal*, 1&2: 1–19.
- Pelser, P.B., D. Nickrent, J.R. Callado & J.F. Barcelona, 2013. Mt. Banahaw reveals: The resurrection and neotypification of the name *Rafflesia lagascae* (Rafflesiaceae) and clues to the dispersal of *Rafflesia* seeds. *Phytotaxa*, 131(1): 35–40.
- Pelser P.B., D.L. Nickrent, C. Gemmill & J.F. Barcelona, 2017. Genetic diversity and structure of Philippine *Rafflesia lagascae* complex (Rafflesiaceae) inform its taxonomic delimitation and conservation. *Systematic Botany*, 42(3): 543–553.
- POWO, 2023. “Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Accessed from: <http://www.plantsoftheworldonline.org/>. Retrieved 31 May 2023.
- Solms-Laubach, H., 1891. Ueber die species in der gattung *Rafflesia*, insonderheit ueber die auf den Philippinen sich findenden Arten. *Annales du Jardin botanique de Buitenzorg*, 9: 241, t. 26, f. 7–10.
- Teschemacher, J.E., 1842a. On a new species of *Rafflesia* from Manila. *Boston Journal of Natural History*, 4(7): 63–66, t.6 (January 1842).
- Teschemacher, J.E., 1842b. On a new species of *Rafflesia* from Manila. *Annals and Magazine of Natural History*, 9(59): 381–384, t. 6 (July 1842)
- Turland, N. J., J.H. Wiersema, F.R. Barrie, W. Greuter, D.L. Hawksworth, P.S. Herendeen, S. Knapp, W.-H. Kusber, D.-Z. Li, K. Marhold, T.W. May, J. McNeill, A.M. Monro, J. Prado, M.J. Price, & G.F. Smith (eds.), 2018. *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017*. Regnum Vegetabile 159. Glashütten: Koeltz Botanical Books. doi: 10.12705/Code.2018