

**A CRITICAL REVIEW OF THE TAXONOMIC STATUS OF
RAFFLESIA PHILIPPENSIS BLANCO (RAFFLESiaceae)
FROM THE PHILIPPINES**

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ABSTRACT

An appraisal of the protologue of *Rafflesia philippensis* shows that it is based on collections from two places, i.e. ‘Monte de Majayjay’ in Mt. Banahaw and Basey, Samar made by two different individuals at different times. The protologue is brief, incomplete, vague and replete with errors that make it impossible to visualize the appearance of the species. There are no preserved specimens (holotypes) of these collections. The portion of the protologue that describes the flowers from Basey, Samar matches *R. manillana* described earlier from the same site. The flowers described from ‘Monte de Majayjay’ cannot be discerned because of the brief and faulty description. Being a mixture of two separate and different collections representing two distinct taxa, *R. philippensis* is thus an invalid name and an erroneously described species. The proposal to resurrect *R. philippensis* as the correct name for the species found in Kinabuhayan, Dolores, Quezon, replacing *R. banahawensis* is erroneous. *R. banahawensis* is, therefore, the correct name of the species in Mt. Banahaw.

KEYWORDS: Rafflesiaceae, Philippines, *Rafflesia*, *R. philippensis*, *R. banahawensis*, Fr. Manuel Blanco

INTRODUCTION

Rafflesia philippensis Blanco was first described in the main text of the second edition of Fr. Manuel Blanco’s **Flora de Filipinas Segun el Sistema Sexual de Linneo** (1845: 565) a few months after his death on April 1, 1845. The original description was reproduced in Spanish and Latin in the 3rd grand edition of the **Flora de Filipinas** (4: 230) in 1880. An English translation of *R. philippensis* was published in the re-issue of the 3rd grand edition of the **Flora de Filipinas** (3: 172) (Galende *et al.*, 1993). This is reproduced below:

“**RAFFLESIA**. Flowers, dioecious. * Male. Cal. one piece, colorful (corolla?), with a bell—shaped tube. There is a corona in its orifice, like a ring, whole. The edge is in five equal parts. Estam. numerous, located in a single file below the vertex of the hunched edge. Anthers sessile, somewhat globulous, cellulose, opening at its apex through a pore. * Females unknown. Parasitic plants. Information based on Mr. Azaola’s letter. [Notes]

RAFFLESIA PHILIPPENSIS. PHILIPPINE RAFFLESIA. * Males? Stem, none, unless it is a tuberous body, about half an inch long sprouting from the roots of an unknown tree (because it has no flowers), to which some *Cissus* were stuck. Many leaves somewhat like imbricated bracts come out of tuber, coriaceous, whole, smooth with dark-colored veins. Calyx sessile, sprouting from the involucre of bracts, monofilous, bell-shaped, with five laminates or sepals, somewhat like petals inserted in the circle of calyx. These and the meat-colored laminates are dotted with white points or white silky glands. --- These are the flowers found by the said wise man on the 22 of April 1840, in the mountain of Majajjai, at 380 toises (740.6 meters) above sea level. The diameter of the flower is nine Spanish inches. A little later, however, he began suspecting that it does not belong to the stated genus but rather to the one called *Brugmansia*. * Females. Stem, leaves, and bracts none. Flowers, sessile placed in a row over the root of an unknown tree or shrub as thick as a finger. Calyx rough, woody, in the shape of an inverse cone, with five laciniae. Corolla of more than fourteen petals, tight before the expansion of the flower, round, concave. Stamens none. Ovary adhering until the middle, in the shape of an inverse cone, crowned by eleven nipples. One of them is in the center, enclosing ten capsules like an umbilicus, slightly inside the alveolus, with numerous seeds in each one. Styles and stigmas, only the nipples. Fruit: they can only be surmised at by the ovary since the flowers were still closed. The ovary is a conical capsule in reverse, with ten chambers, inside containing many seeds. == *Such were the flowers that Fr. Pedro Navarro, a Franciscan naturalist, found in March of 1840 in the mountains of Basey, Leyte. The ones he sent were five on a root. I only opened one so as to not destroy the others. Mr. Cuming, an English naturalist, previously found them in the same place. He spoke to me enthusiastically about these monstrous flowers. He said that they were three or more feet in diameter. I do not know if his were male or female; but I think those are the ones that grow very large. Mine (the closed ones) were not more than two inches in diameter, red and definitely female. However, it seems to me that, once open, they would grow to more than eight inches, at least, in diameter.*

Provenance of *R. philippensis*

Based on the protologue, *R. philippensis* consists of two sets of specimens: male flowers found by Iñigo de Azaola, a friend of Blanco (van Steenis-Kruseman, 1950) in "*Monte de Majajjai*" (*Majajjay*) (now part of Mt. Banahaw-Mt. San Cristobal Protected Area, in Laguna and Quezon, Southern Luzon). The second set of specimens consists of "female" flower buds collected by Fr. Pedro Navarro, a Franciscan priest in Basey, "Leyte" (now part of Samar Province in the Eastern Visayas region). The case of *R. philippensis* therefore poses a nomenclatural and taxonomic problem because

the author described the species based on a mixture of specimens from two provenances collected by two persons on different dates. But reference to the species became confusing because past and even current authors did not distinguish between the two provenances of *R. philippensis*. Most authors (e.g., Brown 1912, 1919; Merrill 1918, 1923; Pancho, 1983; Meijer, 1997; Madulid, 2000; Nais, 2001; Fernando & Ong, 2005) ascribed *R. philippensis* as a synonym of *R. manillana* Teschem. described earlier from Basey, Samar but the flower of *R. philippensis* from Mt. Majayjay, Laguna has not been mentioned in most taxonomic treatments.

Llanos and Fernandez-Villar (1880) were exceptions for they recognized both provenances of *R. philippensis* in their revision of Philippine *Rafflesia*. However, their taxonomic treatment was faulty in that they placed the female flowers of *R. philippensis* together with *R. manillana* (both collected in Basey, Samar) as synonyms of *R. cumingii* R.Br. (Sept 1844). This is erroneous since *R. cumingii* is a superfluous name as Robert Brown merely copied Teschemacher's species and proposed to replace 'manillana' to honour the British collector, Hugh Cuming (Brown, 1844; Mabberley, 1999). The authors further stated that the description of the male flowers of *R. philippensis* (collected in Mt. Majayjay) fits more into a species of another genus, i.e., *Brugmansia* Bl. (*non Brugmansia* Pers. (Solanaceae), and specifically *B. zippelii* Bl. (now known as *Rhizanthus zippelii* (Bl.) Spach.). Their interpretation was, again, erroneous as the species does not occur in the Philippines. Llanos and Fernandez-Villar's revision was marred by numerous errors for they relied only on the original descriptions of Blanco without seeing the 'types'.

While most authors regarded Basey, Samar as the provenance of *R. philippensis* this was contradicted in the book **Rafflesia of the Philippines** (David *et al.*, 2011: 76): "*Rafflesia philippensis* was described by Blanco in the second edition of his *Flora de Filipinas* (1845) based on specimens from Monte de Majajjai (=Mt. Banahaw) Luzon collected by Iñigo Gonzales y Azaola on 20 April, 1840". In the book the authors disregarded Basey, Samar as the other provenance of *R. philippensis* and justified that the species is found only in Mt. Majayjay in Luzon. This is, of course, not the actual case.

In summary, all the authors of past literature on Philippine *Rafflesia* missed to point out that *R. philippensis* was described from two provenances, i.e., Basey, Samar and Mt. Majayjay, and this accounted for the ambiguous and even faulty interpretation of the species. It also raises the issue of the validity of the name since it is described based on two 'types'.

Analysis of the protologue of *R. philippensis*

Blanco did not preserve specimens of his species and this was a serious drawback that hindered the clear and unequivocal understanding of his

species (Merrill 1905, 1918). The only reference available for Blanco's species is the original description or protologue in the **Flora de Filipinas**.

Analysis of the protologue of *R. philippensis* shows that it has inherent defects in content and in substance. For one, Blanco did not actually see the specimen from Mt. Majajjay and he merely copied the description provided to him by Azaola. The description is brief, incomplete, and many floral parts were misidentified such as "leaves" for bracts, "calyx" and "sepals" for perigone lobes, etc. Seriously lacking in the description are the diagnostic characters crucial in distinguishing *Rafflesia* species (Nais, 2001; Mat-Salleh, 1991). These characters are the diaphragm, perigone tube, ramenta, windows, disk, processes and stamens. Without these characters described it is not possible to discern the specific appearance of the *Rafflesia* flower from Mt. Majajjay. Thus, the species as circumscribed in the protologue is unrecognizable.

The description of the "female bud" from Basey, Samar was similarly brief, vague, and incomplete and many floral parts were misidentified, i.e., "petals" for bracts, "calyx" for woody cupule at the base of the bud, inner part of perigone tube for disk, "nipples" for processes. Like the specimens from Mt. Majajjay, there was no mention of important diagnostic characters such as the perigone lobes, diaphragm, perigone tube, ramenta, windows, disk and processes. Furthermore, the description of the ovary is grossly erroneous: "The ovary is a conical capsule in reverse, with ten chambers, inside containing many seeds." The ten chambers mentioned in the protologue do not represent the ovary but actually the anther sacs characteristic of male *Rafflesia* flowers. The author also made a glaring mistake of describing the flowers as having 'many seeds.' Actually he was examining the flower buds and obviously the seeds have not yet developed in the bud stage of the flower. From his description of the floral part Blanco was looking at the tiny pollen grains (Nais, 2001; Mat-Salleh 1991). In effect, Blanco erred in describing the flower (buds) from Samar as female when in fact he was examining a male flower (bud)!

Present status

In recent publications, Barcelona and her colleagues (Barcelona *et al.* 2009, 2011; David *et al.*, 2011) resurrected *R. philippensis* Blanco (1845) as the correct name for the species found in Mt. Banahaw specifically at Kinabuhayan, Dolores, Quezon and which was then named *R. banahawensis* Madulid, Villariba-Tolentino & Agoo (2007).

Rafflesia banahawensis is a species discovered in 2007 along the trail leading to a waterfalls in Kinabuhayan, Dolores, Quezon (Madulid *et al.*, 2007). The site is within the Mt. Banahaw-Mt. San Cristobal Protected Landscape. Another species, *R. banahaw* was later collected and described

from the same site by Barcelona *et al.* (2007). Comparison of the two species showed that they are conspecific, with *R. banahawensis* as the correct name having been published earlier. In a subsequent paper Barcelona *et al.* (2008) recognized *R. banahawensis* as the correct name of the species but later reduced it, together with *R. banahaw*, as synonyms of *R. philippensis* (Barcelona *et al.*, 2009). The reason they cited for the proposed synonymy was “Both teams of researchers overlooked the close similarities between this taxon and *R. philippensis*.”

The resurrection of *R. philippensis* as the correct name for the species in Kinabuhayan, Dolores, Quezon is questionable. Previous authors like Miquel (1856), Llanos & Fernandez-Villar (1880), Solms-Laubach (1901), Koorders (1918), Merrill (1923), Meijer (1997), Nais (2001), Fernando & Ong (2005) were consistent in regarding *R. philippensis* as a synonym of *R. manillana*. These authors presumed that the collections from the two provenances of *R. philippensis* represent the same taxon. Strangely not one of them made a taxonomic distinction between the Basey, Samar and Mt. Majayjay collections. This presumption has long been perpetuated in the literature until recently when the present authors and some DENR staff in Samar recollected *R. manillana* in its type locality and confirmed the integrity of the species (Madulid & Agoo, 2007). This also clarified that *R. philippensis* from Basey, Samar is indeed the same taxon as *R. manillana* and is a junior synonym of the latter as it was published later.

Barcelona *et al.* (2009) stated that the Mt. Majayjay mentioned in the protologue of *R. philippensis* is the same as Mt. Banahaw. They also claimed that *R. banahawensis* described from that part of Mt. Banahaw in Kinabuhayan, Dolores, Quezon is the same as Mt. Majayjay and therefore coming from the same mountain, *R. banahawensis* and *R. philippensis* are the same species with the latter being the correct name as it was published earlier. Their claim is questionable since it has been explained earlier that the protologue of *R. philippensis* is brief, incomplete, unclear and inaccurate and its appearance could therefore not be discerned. That being the case, it is not possible to compare *R. philippensis* with *R. banahawensis*. Furthermore, the type locality of *R. philippensis* is not clearly stated in the protologue and it may actually be on that side of Mt. Banahaw facing Majayjay, Laguna rather than that side of the mountain facing Kinabuhayan, Dolores, Quezon, the type locality of *R. banahawensis*.

As explained above, the concept of *R. philippensis* was based on a mixture of two taxa represented by separate collections from two places by two collectors on different occasions. The specimen from Basey, Samar actually represents the species earlier named as *R. manillana* described from the same place but the identity of the collection from Mt. Majayjay (Laguna) was dubious because its appearance cannot be established with certainty from the protologue. There was also no description of diagnostic characters of the species and the original author confused the flower as female, when in fact, it

was a male!

Examination of the protologue of the neotype of *R. philippensis*, which is the holotype of *R. banahaw*, selected by Barcelona *et al.* (2009) shows that it cannot be matched with certainty with the problematic and faulty protologue of *R. philippensis*. Art. 9.19 of ICN (McNeill *et al.*, 2012) states, in part, that the neotype can be superseded if it can be shown that “it is in serious conflict with the protologue.” The neotype was collected in Kinabuhayan, Dolores, Quezon while the type locality of *R. philippensis* is in Mt. Majajjay. Merrill (1918) categorically mentioned: “Whenever possible a Blancoan species should be interpreted by specimens originating as near as possible to the exact place indicated by Blanco, i.e. by *topotypus*.” Thus, the question on the appropriateness and accuracy of the neotype selected come to the fore.

In their paper, Barcelona *et al.* (2009) briefly cited the presence of a common character of *R. philippensis* and *R. banahawensis* to justify their conspecificity. They specifically cited the “rough and woody calyx” mentioned in the protologue of *R. philippensis* as corresponding to the ‘woody’ diaphragm of *R. banahawensis*: “*This seems to resemble the conspicuous yet rugose diaphragm of R. banahawensis* (Barcelona *et al.*, 2009: 87). This is certainly an error of interpretation because the ‘calyx’ being referred to by Blanco is the woody cupule or cup-like structure at the base of the flower and not the diaphragm which, at the bud stage, is certainly not yet woody. Illustrations of this floral structure are shown in Mat-Saleh (1991) and Nais (2001). Furthermore, the ‘woody calyx’ described in the protologue of *R. philippensis* was a description of the ‘female’ flower (actually it is a male flower, see explanation above) collected from Basey, Samar and not from Mt. Majajjay! In effect, Barcelona *et al.* (2009) were justifying that *R. banahawensis* from Kinabuhayan, Dolores, Quezon is one and the same as the *R. philippensis* from Basey, Samar (= *R. manillana*). This effectively contradicted their previous statement that *R. banahawensis* is conspecific with *R. philippensis* from Mt. Majajjay.

CONCLUSION

Based on the above discussions it is clear that *R. philippensis* is an invalid name following the International Code of Nomenclature for Plants, Algae and Fungi (McNeill *et al.*, 2012). The protologue is brief, vague, incomplete, ambiguous and replete with errors that it cannot serve as reference to the clear and unequivocal identification of the species. Its resurrection as the correct name for the *Rafflesia* species in Kinabuhayan, Dolores, Quezon is, therefore, unjustified. *Rafflesia banahawensis*, described by Madulid *et al.* (2007) and reduced by Barcelona *et al.* (2009) as a synonym of *R. philippensis*, is the correct name of the species in Mt. Banahaw at Kinabuhayan, Dolores, Quezon.

ACKNOWLEDGEMENT

We wish to thank Dr. George Argent, Royal Botanic Gardens, Edinburgh, U.K. Prof. Abdul Latiff, Universiti Kebangsaan Malaysia and Dr. I. Buot, Jr., University of the Philippines at Los Baños, Laguna for their valuable comments.

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