

New distribution record of *Podocarpus rumphii* Blume in the Philippines

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ABSTRACT

Podocarpus is known to be the largest genus in the family Podocarpaceae, with ten recognized species in the Philippines including *Podocarpus rumphii* Blume. This species has been observed in Asian countries with concentration in the Southeastern part including Indonesia, Malaysia, Papua New Guinea, and the Philippines. In this paper, a new distribution record of *P. rumphii* Blume in the Philippines is presented. A biodiversity assessment lead to the discovery of this species in the upper montane forest of Columbio, Sultan Kudarat. Morphological characters and species-specific identification was based on the work of Salvaña *et al.* (2018). Coordinates were gathered and a map was generated. With this, there is a need to develop conservation measures towards the area and the species considering that there is a decreasing trend in the population of the species.

Keywords: conservation, distribution, *Podocarpus*, *Podocarpus rumphii*, Sultan Kudarat

INTRODUCTION

The genus *Podocarpus* L' Hér. ex Pers. is the largest genus in the family Podocarpaceae, which is the second largest conifer family after Pinaceae. It is also the family's most extensively spread genus, with species endemic to all continents except Europe and Antarctica. Tropical and subtropical Asia, as well as South and Central America, have the highest densities of species (Mill, 2014). *Podocarpus* has around 107 species, which account for more than half of the total number of species in the family (de Laubenfels, 1985). In the Philippines, ten species were recognized including *Podocarpus costalis* C. Presl, *P. glaucus* Foxw., *P. lophatus* de Laub., *P. macrocarpus* de Laub., *P. neriifolius* D. Don., *P. palawanensis* de Laub. & Silba,

P. pilgeri Foxw., *P. polystachyus* R. Br. ex Endl., *P. ramosii* R.R. Mill, *P. rumphii* Blume (Salvaña and Gruezo, 2018). One of the important species under this genus is *P. rumphii* Blume due to its good quality timber. In the study of Salvaña *et al.* (2018), Philippine distribution of this species includes Southern Luzon, Bohol and Leyte in Visayas and major biodiversity landscapes of Mindanao.

Within the Mindanao Island, some important biodiversity landscapes have not been explored which include different forests of Columbio, Sultan Kudarat.

MATERIALS AND METHODS

In May 2022, a biodiversity assessment was conducted in the upper montane forest of Bulol-lomot, Columbio, Sultan Kudarat (Figure 1A and 1B). During the assessment, some populations of *P. rumphii* Blume were observed and recorded. An additional three field surveys were conducted to determine other local populations of the species. Leaves of the species were collected as samples through hand-picking along with photo-documentation. General and specific characters were described including habit, tree height, bark and the leaves. Reproductive structures were not observed during the field survey. Voucher specimen, including branches with leaves measuring 1 foot, were collected and preserved.

The species identification was based on the identification key to species according to the work of Salvaña *et al.* (2018) using morphological characters and species-specific confirmation was additional conducted by Dr. Florence Roy P. Salvaña, a botanist and one of the authors from the University of Southern Mindanao, Kabacan, Cotabato. The locations of the species was tagged for mapping.

Conservation status of the species was checked in the International Union for Conservation of Nature (IUCN) Red List and Department of Environment and Natural Resources (DENR) Administrative Order-2007-01.

RESULTS AND DISCUSSIONS

Four individuals of *P. rumphii* Blume were recorded in the area with an elevation of 1,462 masl and 1,577 masl (Figure 2A and 2B). The recorded species was found in the steep area of the forest (upper montane), together with other species including *Dacrycarpus imbricatus* (Blume) de Laub. And *Lithocarpus elegans* (Blume) Hatus. ex Soepadmo. These tree species, including *P. rumphii* Blume, were observed at the side of mountain ridges with an estimated slope of 45°. Mosses were also observed covering some portions of the tree species recorded.

Based on the current distribution (Figure 3 and Table 1), *P. rumphii* Blume was observed in San Miguel, Bulacan, Makiling National Park in Laguna, Infanta in Quezon, Mt Halcon in Mindoro, Raja Sikatuna Forest Reserve in Bohol, Mt. Apo Range (Davao Side), a geothermal power plant site in Kidapawan (Cotabato Province), Mt Kitanglad Range in Bukidnon, NALCO, Tungao in Agusan del Norte and Mt Hamiguitan in Davao Oriental (Salvaña *et al.*, 2018). Considering this, it can be hypothesized that this present distribution originated from biodiversity landscapes of Mindanao as several occurrences of this species were observed. However, this origin, whether caused by dispersal or vicariance, is yet to be determined.

The observed species (Figure 4) was described as is a large tree ranging from 40–42 meters tall and diameter at-breast-height (dbh) range of 56–60 cm. Leaves are linear, slender and acute. Examination of the collected samples revealed a distinguishable indistinct broad low ridge in the upper midvein measuring 0.5–0.7 mm, and more or less prominent lower midvein (4–10 mm) tapered abruptly at the base to the petiole. This description falls into the description of *P. rumphii* Blume as indicated in the study of Salvaña *et al.* (2018). Cones and seeds were not available during the whole duration of sampling. However, in addition to the description based in the study of Salvaña *et al.* (2018), male cones of this species can

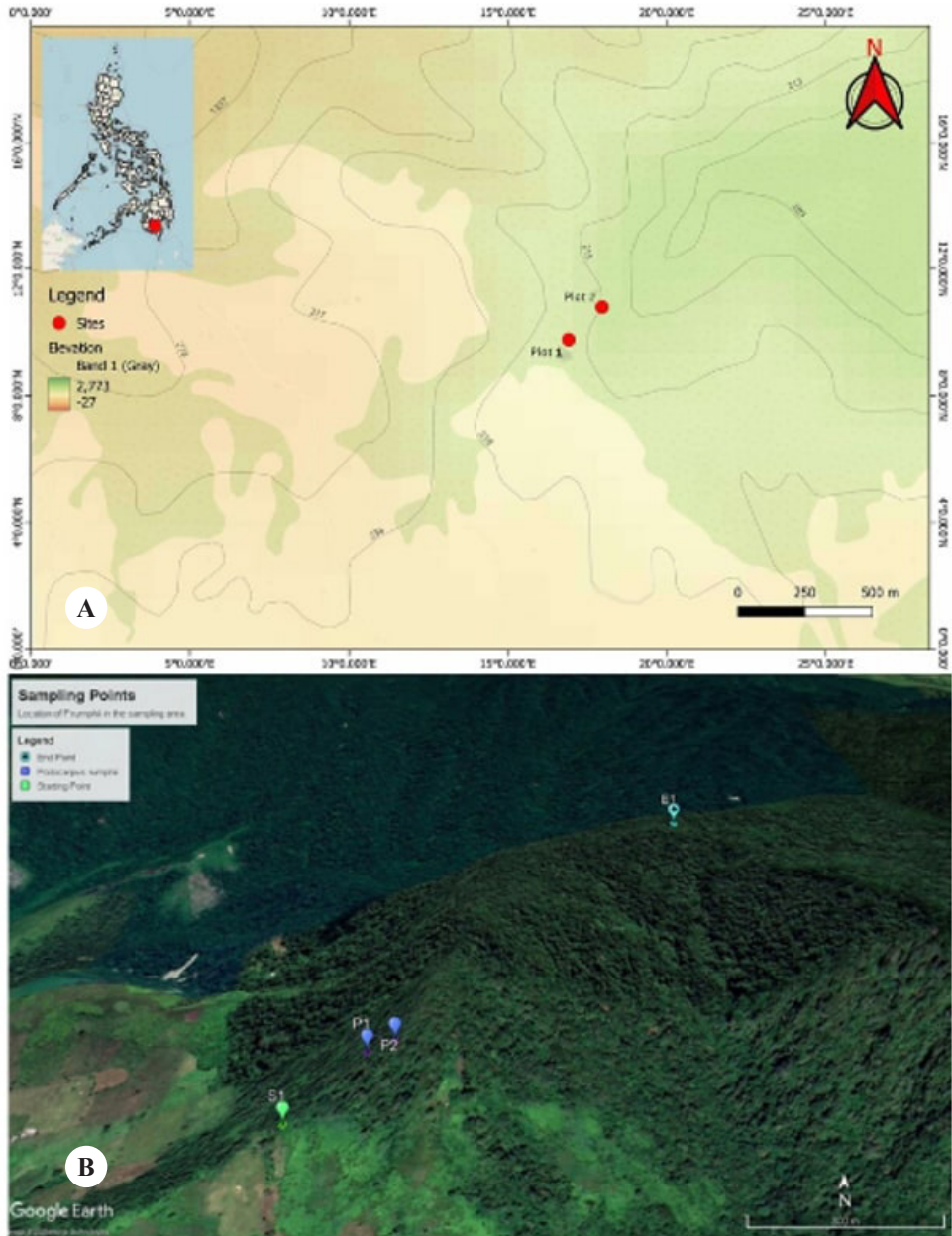


Figure 1. A, Topographic map generated for the location instead of distribution of *P. rumphii* Blume in Columbio, Sultan Kudarat, Philippines; B, Trail map generated using Google Earth.

be described as sessile, slender, in clusters of at least five and as many as eight measuring 3–4.5 cm long and 2–4 mm in diameter, including small sterile scales that forms a cluster, microsporophyll apex with rounded projections which were usually crowded. Peduncle of the seed-bearing structure ranges from 7–13 mm long; receptacle with a fertile bract measures 10–12 mm long along with the two sterile fertile bract which measures 7–8 mm in the second

bract, and 6 mm on the third. Seed is ovoid in shape including the covering that measures 11–15 mm long and 10–12 mm in diameter which is reduced at the base to a wedge with 0.9–1 mm long.

According to the IUCN (2013; ver. 3.1) and the assessment of Fernando *et al.* (2008) which is supported by Salvaña and Gruezo (2018), *P. rumphii* Blume is one of the *Podocarpus* species classified as Near Threatened with a decreasing population due to logging agriculture and biological resource use. Based on criterion A2cd of the IUCN (2013; ver. 3.1), the decline's extent may have approached 30% over the last 75 years (=three generations), which nearly makes it eligible for classification as a Near Threatened species. Therefore, newly recorded distribution of this species is a gateway for the local government to develop conservation strategies in the area.

CONCLUSION



Figure 2. A, Closer shot of species *P. rumphii* Blume in Columbio, Sultan Kudarat; B, wide shot of *P. rumphii* Blume in Columbio, Sultan Kudarat. (image: Lui Adriel Malapitan).



Figure 3. Distribution of *P. rumphii* Blume in the Philippines with new distribution in Columbio, Sultan Kudarat (●), Salvaña *et al.* (2018).

Table 1. Philippine Distribution of *P. rumphii* Blume, Salvaña *et al.* (2018)

Herbarium No.	Taxon/ Area of Collection	Source
27041	<i>Podocarpus rumphii</i> Bl.- Makiling Forest, Los Baños, Laguna	MNH
27210	<i>Podocarpus rumphii</i> Bl.- Makiling Forest, Los Baños, Laguna	MNH
27712	<i>Podocarpus rumphii</i> Bl.- Road to Mudspring, Forestry Campus, UPLB.	MNH
20519	<i>Podocarpus rumphii</i> Bl.- Road to Mudspring, Forestry Campus, UPLB.	MNH
18379*	<i>Podocarpus philippinensis</i> Foxw.	MNH
5174*	<i>Podocarpus philippinensis</i> Foxw.- Limay Peak, Bataan	MNH
61685	<i>Podocarpus rumphi</i> Bl.- Near Geothermal Power Plant, Mt. Apo. Kidapawan City, North Cotabato	MNH

Herbarium No.	Taxon/ Area of Collection	Source
18378	<i>Podocarpus rumphii</i> Bl.- College of Forestry, UPLB	MNH
4936	<i>Podocarpus philippinensis</i> Foxw.- Annotated: <i>Podocarpus rumphii</i> Bl. (L. Co)- Infanta, Quezon	PUH
6771	<i>Podocarpus rumphii</i> Bl.- Makiling National Park, Laguna	PUH
6739	<i>Podocarpus rumphii</i> Bl.- Makiling National Park, Laguna	PUH
4935	<i>Podocarpus philippinensis</i> Foxw.- Annotated: <i>Podocarpus rumphii</i> Bl. (L. Co)- College of Forestry, UPLB	PUH
6762	<i>Podocarpus philippinensis</i> Foxw.- Annotated: <i>Podocarpus rumphii</i> Bl.- Mt. Makiling, Laguna	PUH
6752	<i>Podocarpus philippinensis</i> Foxw.- Annotated: <i>Podocarpus rumphii</i> Bl.- Mt. Makiling, Laguna	PUH
6733	<i>Podocarpus philippinensis</i> Foxw.- Annotated: <i>Podocarpus rumphii</i> Bl.- Mt. Makiling, Laguna	PUH
5028	<i>Podocarpus philippinensis</i> Foxw.- Annotated: <i>Podocarpus rumphii</i> Bl.- Makiling National Park, Laguna	PUH
5073	<i>Podocarpus philippinensis</i> Foxw.- Annotated: <i>Podocarpus rumphii</i> Bl. (L.Co)- Sibul, San Miguel, Bulacan	PUH
5143	<i>Podocarpus philippinensis</i> Foxw.- Annotated: <i>Podocarpus rumphii</i> Bl. (L.Co)- Infanta, Quezon	PUH



Figure 4. A, Tree bark of *P. rumphii* Blume; B, collected leaves; C, research team during the conduct.

The new distribution record of *P. rumphii* Blume indicates a necessity to conduct additional biodiversity surveys in less explored habitats. Several species with limited distribution records may have existed in these biodiversity landscapes. This study includes the new distribution record of *P. rumphii* Blume as a result of biodiversity exploration conducted in Columbio, Sultan Kudarat. This provides additional information on the present distribution of the species. In addition, this will also provide information for local government units to develop conservation strategies towards forest areas where this species occurs considering the fact that this species has a decreasing population.

This new distribution record may have originated from the nearby biodiversity landscapes in Mindanao as this species was also observed in these areas.

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