WEBBIA Journal of Plant Taxonomy and Geography

Firenze University Press
www.fupress.com/webbia

OPEN ACCESS

Citation: Kean Roe F. Mazo, Rudolph Valentino A. Docot, Axel Dalberg Poulsen (2022) The ginger genus *Burbidgea* confirmed in the flora of the Philippines. *Webbia. Journal of Plant Taxonomy and Geography* 77(2):321-325. doi: 10.36253/jopt-13518

Received: August 9, 2022

Accepted: September 8, 2022

Published: December 15, 2022

Copyright: © 2022 Kean Roe F. Mazo, Rudolph Valentino A. Docot, Axel Dalberg Poulsen. This is an open access, peer-reviewed article published by Firenze University Press (http://www.fupress.com/webbia) and distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Competing Interests: The Author(s) declare(s) no conflict of interest.

Editor: Lia Pignotti

ORCID
KRFM: 0000-0002-5131-9084
RVAD: 0000-0002-5774-2481
ADP: 0000-0002-7651-6439

The ginger genus *Burbidgea* confirmed in the flora of the Philippines

Kean Roe F. Mazo[1,*], Rudolph Valentino A. Docot[2], Axel Dalberg Poulsen[3]

[1] *Department of Forestry, College of Agriculture and Forestry, Jose Rizal Memorial State University-Katipunan Campus, Zamboanga del Norte, 7109, Philippines*
[2] *Department of Biological Sciences, Institute of Art and Sciences, Far Eastern University, Nicanor Reyes Sr. Street, Sampaloc, Manila 1015, Philippines*
[3] *Royal Botanic Garden Edinburgh, Inverleith Row, Edinburgh EH3 5LR, Scotland, UK*
*Author for correspondence. Email: keanmaze@gmail.com

Abstract. The facultative epiphytic ginger genus *Burbidgea* harbours six species hitherto thought to be endemic in Borneo. Recent fieldwork in Zamboanga region, Mindanao, Philippines, resulted in the collection of a ginger, which we identified as *Burbidgea nitida*. The species, however, was already collected in Zamboanga region in 1919 but the evidence remained misidentified for a long time as *Hedychium*. Including the *Burbidgea* in the flora of the Philippines, increases the number of native ginger genera of the country to 17. Based on the recent collections, a complete description of *B. nitida* in the Philippines is provided here including illustrations and notes on ecology and a local name. We lectotypify *Burbidgea nitida*, the type of the genus, and clarify the overlap of native ginger genera and species between Borneo and Philippines.

Keywords: Borneo endemics, *Burbidgea nitida*, Huxley's Line, Zamboanga.

INTRODUCTION

The Zamboanga region in the southwestern part of the Philippines has a unique biogeographical history (Dickerson et al. 1928). The region including the islands of Basilan, Sulu, and Tawi-Tawi has a diverse flora and fauna with a strong Bornean affinity (Valejo 2011). The understanding of the biodiversity of this region is poorly known because the ongoing insurgence has made exploration difficult in the past decades.

The number of ginger genera in the Philippines increased in the past few years as a result of taxonomic revisions and recent discoveries performed by several Filipino botanists. In 2022, Mazo et al. reported the occurrence of the genus *Sulettaria* A.D.Poulsen & Mathisen in the Philippines, resulting in a total of 18 ginger genera (Pelser et al. 2011 onwards) including *Curcuma* L. and *Kaempferia* L. that are not native.

In 2021, an epiphytic ginger was collected in the municipality of Leon B. Postigo, Zamboanga del Norte, Philippines. The taxon was found to be

a member of the genus *Burbidgea* Hook.f. This genus was thought to be endemic to Borneo (Smith 1972) and therefore represents a new genus record for the Philippines. After reviewing protologues and other published papers as well as examining herbarium collections including types, we identified the species as *Burbidgea nitida* Hook.f. In the present paper, we formally report the new distribution record of *Burbidgea* to the Philippines and provide detailed information based on the recent material. This increases the number of ginger genera (including non-native) of the country to 19.

MATERIAL & METHODS

The collections were made in the field following standard methods ensuring flowers were pickled in 70% ethanol. Relevant herbarium specimens deposited at E, K, L, PNH, SING, SAR, US, digital images accessed on Zingiberaceae Resources Centre (Newman et al., 2005 onwards) and JSTOR Global Plants (https://plants.jstor.org/), and publications by Smith (1972, 1984) were consulted for identification. The description made in this paper is based on living material, dried specimens, and photographs.

TAXONOMIC TREATMENT

Burbidgea Hook.f. in Bot. Mag. 105: t. 6403. 1879.

Type: *Burbidgea nitida* Hook.f.

A genus of herbaceous perennials, terrestrial or epiphytic plants currently represented by six species which are native to Borneo (Smith 1972; Neo et al. 2020; Newman & al. 2005–). The present paper extends its distribution to include the Philippines. The genus is morphologically most closely related to *Riedelia* Oliv. in New Guinea but can be distinguished by having a persistent calyx, a labellum that is much longer than broad and bilobed in the upper third, and narrow and much elongated fruits. Smith (1972) divided *Burbidgea* species in two groups based on the shape of the dorsal petal and the bilobed part of the labellum.

Burbidgea and three other genera (*Pleuranthodium* (K.Schum.) R.M.Sm., *Riedelia* and *Siamanthus* K.Larsen & J.Mood) are placed in the tribe Riedelieae characterized by long, slender silique-like capsules that open by longitudinal slits to the base (Kress et al. 2002; Smith 1972; Larsen and Mood 1998).

Burbidgea nitida Hook.f., Bot. Mag. 105: t. 6403. 1879.

Type: Cultivated at Veitch' nursery, 1878, *F.W.T. Burbidge s.n.,* lectotype K000292495!, designated here. Origin: Borneo, Malaysia, Sarawak, Fifth Division, between Lawas and Trusan River, 300–460 m, 1877, *F.W.T. Burbidge s.n.*

Description

Description based on Philippine collections: Epiphytic herb in dense clump. Rhizome 8.5–11.4 mm in diameter, yellowish green externally, cream internally, scales thick and fleshy, 8–13 mm long, glabrous, light brown. Leafy shoot 45–55 cm long, arching, with ca. 12 leaves per shoot; sheath glabrous, sparsely scabrid at the margin, pale green; ligule oblong, 4.5–6.5 × 3–6 mm, glabrous, mid-green, apex emarginate; petiole 3–7 mm long, glabrous, mid-green; lamina elliptic, 12–21 × 4–6 cm, glabrous on both sides, coriaceous, smooth, mid-green, base obtuse, margin entire, apex acuminate. Inflorescence terminal to the leafy shoot; free part of peduncle 1.8–4.5 cm long, glabrous, maroon to bright red; spike hemispherical, monopodial, 7–10 × 4–5.6 cm, with 12–20 flowers, 2–6 open at a time; basal bracts solitary, caducous, elliptic to ovate, 4.8–5 × 1.8–2 cm, glabrous, light orange tinged white, apex mucronate; rachis unbranched, 3.5–4 cm long, bright red, glabrous; fertile bracts and bracteoles absent; pedicel 3–4 mm long, puberulent, bright red; calyx 12–18 mm long, sparsely puberulent, bright red, apex 3-dentate; corolla tube 20–23 mm long, glabrous outside, inside puberulous in upper half, bright red to orange, lighter in the upper part; corolla lobes glabrous on both sides, orange to bright red, dorsal lobe ovate, 20–25 × 10–15 mm, apex mucronate, lateral lobes narrowly ovate, 20–25 × 8–11 mm, apex shortly mucronate; labellum spatulate, 11–15 mm long, the base forming a short 6–11 mm semi-tube clasping the filament, apex deeply bilobed, lobes ovate and petaloid, 3–5 × 3–4 mm, glabrous, yellow to orange (with age), apex rounded; lateral staminodes absent; stamen 18–20 mm long when flattened; filament 1.2–1.5 mm long, glabrous, yellow to orange; anther linear, 7–10 × 0.5–1 mm, connective tissue pubescent, orange; thecae 7–10 × 0.4–0.6 mm, glabrous, white to pale yellow; anther crest cuneiform, petaloid, 5–6 × 4–5 mm, glabrous except for puberulous base, light orange or red, margin undulate; style 3–3.5 cm long, puberulent, white; stigma c. 0.8 mm wide, ostiole rounded triangular, margin with erect hairs, crest c. 0.5 mm long rounded entire, white; epigynous glands 2, linear, 2–3 mm long, glabrous, cream, apices rounded, laterally flattened; ovary narrowly cylindric, 6–8 × 2–3 mm, pubescent,

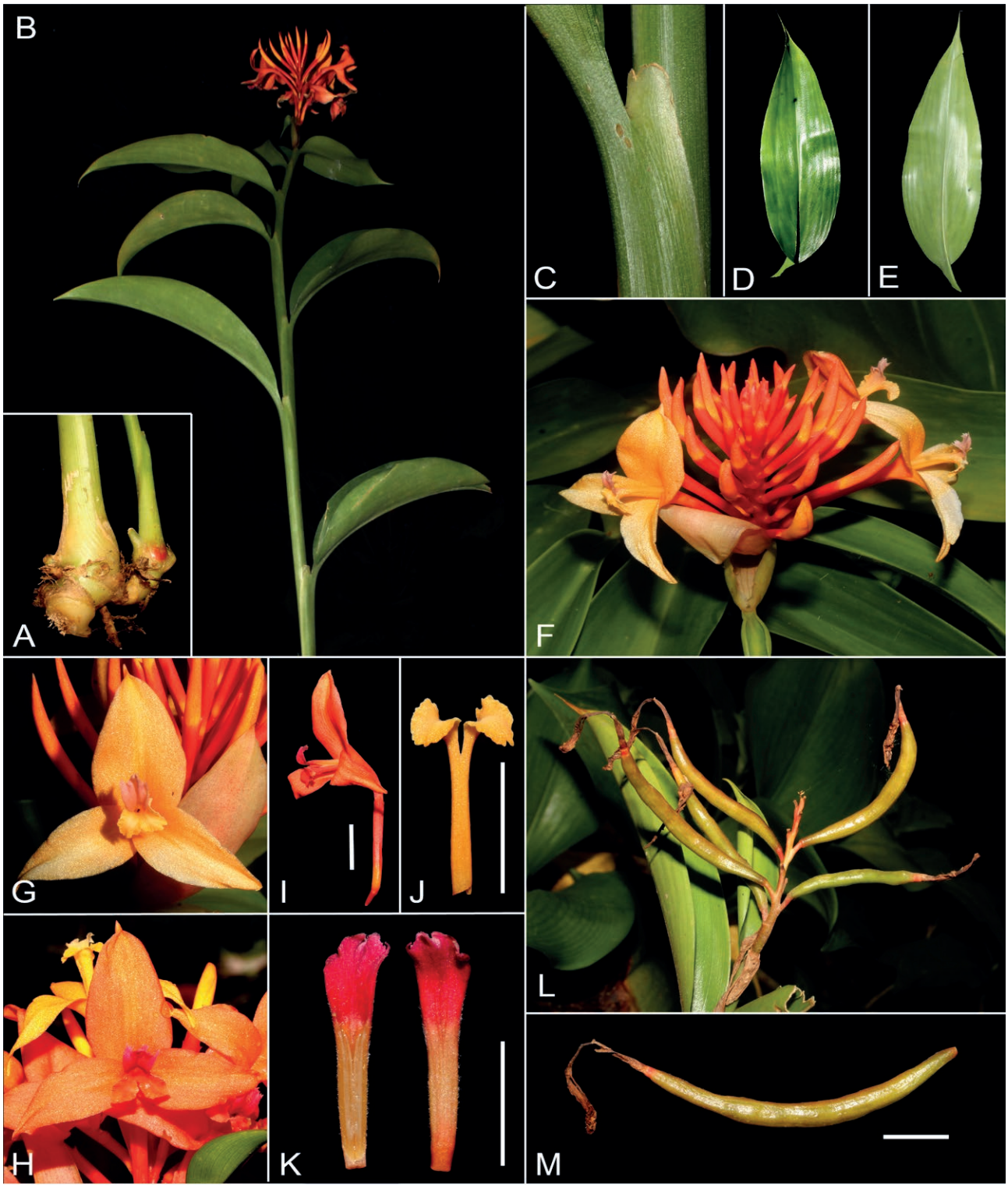

Figure 1. *Burbidgea nitida*. **A.** Base of the leafy shoot. **B.** Habit. **C.** Ligule. **D.** Leaf abaxial surface. **E.** Leaf adaxial surface. **F.** Inflorescence. **G.** Flower anthesis with light orange corolla lobes and labellum. **H.** Flower with red-orange corolla lobes and labellum. **I.** Flower removed (side view). **J.** Labellum. **K.** Stamen (front & back view). **L.** Infructescence. **M.** Fruit. Based on *K.R.F. Mazo 46* (A-K) and *K.R.F. Mazo 91* (L-M). Photos by: K.R.F. Mazo. Scale bars = 1 cm.

Table 1. Species of Zingiberaceae occurring in both Borneo and the Philippines.

Species
Etlingera brevilabrum (Valeton) R.M.Sm.
Etlingera coccinea (Blume) S.Sakai & Nagam.
Etlingera fimbriobracteata (K.Schum.) R.M.Sm.
Etlingera sessilanthera R.M.Sm.
Geocharis fusiformis (Ridl.) R.M.Sm.
Globba francisci Ridl.
Hornstedtia havilandii (K.Schum.) K.Schum.
Plagiostachys albiflora Ridl.
Sulettaria longituba (Ridl.) A.D.Poulsen & Mathisen

orange. Infructescence 4.5–9 cm long; fruits narrowly elongated, 30–46 × 3–5 mm, sparsely pubescent, yellow-green becoming greenish red when mature, remnant of calyx persistent; seeds fusiform, 4.5–5 mm, brown with white aril; aril transparent white, 0.06 mm thick, covering the seed.

Etymology

The genus is named in honour of the British explorer, Frederick William Burbidge (1847–1905), who discovered *Burbidgea nitida* during an expedition to Borneo. The epithet means polished or glossy referring to the shiny leaf blades.

Vernacular name

Locally known as *lakimag* by the Subanen people of Zamboanga del Norte. Uses not recorded.

Ecology and distribution

In the Philippines, *Burbidgea nitida* is only confirmed recently in the provinces of Zamboanga del Norte and Zamboanga Sibugay, both in the Zamboanga Region. The locality, Mt. Tubuan, where *M. Ramos & G.E. Edaño 36732* was collected, is impossible to place on a current map; most probably the name of the mountain is no longer used, so we are not sure in which province this is in the Zamboanga Region.

During fieldwork, only one population was observed growing epiphytically on small trees in shaded secondary lowland evergreen rainforests at 380–400 m.

Notes

The closest genus in terms of morphology in the Philippines is *Hedychium*, which is represented by two species in the country. It is therefore not surprising that the two collections at Kew by *M. Ramos & G.E. Edaño* (*36732* and *36882*) from 1919 were initially identified as *Hedychium*. Even though these collections included flowers (*36882*) and fruits (*36732*), the identification was not updated for a very long time when the labels were edited with an ink pen, '*Hedychium*' crossed out and '*Burbidgea nitida*' added. The handwriting matches that of Rosemary M. Smith and her undated annotations must have been done after her two papers on the genus in 1972 and 1984, none of which mentioned an occurrence in the Philippines. They were not reported in any later publication but the records did become available online (Newman & al. 2005–). Our study based on collections from the same plant of flowers and fruits confirms her identification.

The original material at Kew herbarium placed in a type folder consists of three sheets (K000292494, K000292495, K000292496) representing at least two gatherings from the plant cultivated at Veitch' nursery originally collected by F.W.B. Burbidge in Borneo in 1877. It is not written who actually collected the material in the nursery but it may very well be Burbidge himself as Hooker (1879), when describing the new genus, mentioned the pencil sketch made by Burbidge (attached to the sheet barcoded K000292495). This beautiful sketch clearly matches the flower details of the plate (Hooker 1879) and unlikely to have been done during field conditions in Borneo. A note in pencil attached to the third sheet (K000292496) says that 'These are not good specimens being the weak second growths of the season' and thus obviously an observation made during cultivation. Hooker indeed clarified that the plant flowered twice within the first year after having been brought into cultivation. This would make the year of collection of the cultivated material 1878 as somebody has also added in pencil to K000292494. We designate here K000292495 as the lectotype as it is the most informative.

When Burbidge collected this species later to be named in his honour in Borneo, he only found one population in shady forest (Hooker 1879; Veitch 1906), similar to the recent collection made in Philippines but whereas the former was thriving on moist rocks the latter was epiphytic. The labels of most other Bornean collections we have examined state that the plant was terrestrial. Maybe future collections in the Philippines will reveal that this species may also grow terrestrially there.

Borneo harbours native 24 ginger genera and 260 species whereas the Philippines has 17 genera and 127 species (including *Burbidgea nitida*). Currently, 14 native ginger genera but only nine species overlap between the two areas (Table 1), three of which are in Palawan, the other six crossing the Huxley's line (extension of Wal-

lace's Line to the Philippines). Therefore, it is not surprising that the genus *Burbidgea* also crosses Huxley's line even though it would have been more likely that a taxon in Borneo is also found in other parts of Sundaland (Java, Sumatra or the Malay Peninsula).

Even though *Burbidgea* is here documented for the Philippines and Mood et al. 2020 synonomised *Haplochorema* K.Schum. in *Boesenbergia* Kuntze, three other ginger genera still remain endemic in Borneo: *Borneocola* Y.Y.Sam (Sam et al. 2016 convincingly separated this genus from *Scaphochlamys* Baker using molecular and morphological data), *Epiamomum* A.D.Poulsen & Škorničk. and *Myxochlamys* A.Takano & Nagam. Surprisingly, none of these genera were listed in Neo et al. 2020.

Specimens examined

Cultivated plant at Veitch' nursery, collected as the lectotype from the same plant originally from Borneo, 1878, *F.W.T. Burbidge s.n.*, (K, syntypes K000292494!, K000292496!, likely not collected the same date). Philippines, Mindanao. Zamboanga District, Mount Tubuan, October 1919, *M. Ramos & G.E. Edaño 36732* (K!, US 00336046!); same District, Malangas, November 1919, *M. Ramos & G.E. Edaño 36882* (K!, US 00336047!); Zamboanga del Norte. Cultivated plant at barangay Tinuyop, Leon B. Postigo, (4 km from the wild locality), 300 m, 3 July 2021, *K.R.F. Mazo 46* (PNH, acc. no. 258613!); 24 October 2021, *K.R.F. Mazo 91* (FEUH 004111! [spirit material only]); plant originally collected at Leon B. Postigo, Barangay Tinuyop, near Lunganitan, 8°3'40.29"N, 122°56'11.69"E, 640 m, 25 March 2021, *K.R.F. Mazo s.n.*

ACKNOWLEDGMENTS

We are grateful to the local government units of the municipality of Leon B. Postigo, indigenous people of barangay Tinuyop, Department of Environment and Natural Resources (DENR) Region 9 for the support and permits to conduct this study. K.R. Mazo expresses his gratitude to the Department of Science and Technology-Science Education Institute (DOST-SEI) for his scholarship grant through the Science and Technology Regional Alliance of Universities for Inclusive National Development (STRAND) Project. We are most grateful to Dr. Tim Utteridge, who kindly shared his photographs of the cited Philippine specimens in the Kew Herbarium and to Dr. Mark F. Newman for discussing the origin of the original material of *B. nitida*.

REFERENCES

Dickerson R, Merrill ED, McGregor RC, et al. 1928. Distribution of Life in the Philippines. Manila, Bureau of Science. 322 pp.

Hooker JD. 1879. *Burbidgea nitida*. Native of Borneo. Curtis's Botanical Magazine 105: tab. 6403.

JSTOR Global Plants (continuously updated) https://plants.jstor.org.

Kress JW, Prince LM, Williams KJ. 2002. The phylogeny and a new classification of the gingers (Zingiberaceae): Evidence from molecular data. American Journal of Botany. 89 (11): 1682–1696.

Larsen K, Mood J. 1998. *Siamanthus*, a new genus of Zingiberaceae from Thailand. Nordic Journal of Botany. 18: 393–397.

Mazo KRF, Docot RVA, Poulsen AD. 2022. *Sulettaria*, a new ginger genus in the flora of the Philippines. Nordic Journal of Botany: e03564.

Mood JD, Ardiyani M, †Veldkamp JF, Mandáková T, Prince LM, de Boer H.J. 2020. Nomenclatural changes in Zingiberaceae: *Haplochorema* is reduced to *Boesenbergia*. Gardens' Bulletin Singapore 72(1): 77–95. 2020 doi: 10.26492/gbs72(1).2020-08.

Neo L, Wong KM, Tan HTW. 2020. A synopsis of the endemic plant genera in Borneo. Nordic Journal of Botany: e02871.

Newman M. & al. 2005 onwards. Zingiberaceae Resource Centre. Online database available from https://padme.rbge.org.uk/ZRC/

Pelser PB, Barcelona JF, Nickrent DL (eds). 2011 onwards. Co's Digital Flora of the Philippines. http://www.philippineplants.org.

Sam YY, Takano A, Ibrahim H, Zaveska E, Aziz F. 2016. *Borneocola* (Zingiberaceae), a new genus from Borneo. Phytokeys. 75: 31–55.

Smith RM. 1972. The genus *Burbidgea*. Notes from the Royal Botanic Garden Edinburgh. 31: 297–306.

Smith RM. 1984. Zingiberaceae of Gunung Mulu National Park pp. 85–96 in A.C. Jermy (ed.), Studies on the Flora of Gunung Mulu National Park Sarawak. Kuching, Sarawak.

Valejo B. 2011. The Philippines in Wallacea. Telnov D. (ed.) 2011. Biodiversity, Biogeography and Nature Conservation in Wallacea and New Guinea, Vol. I. 27–42.

Veitch JH. 1906. Hortus Veitchii. A History. London, J. Veitch & sons Ltd. 542 pp.