

DIPLYCOSIA KITANGLADENSIS* SP. NOV. FROM MINDANAO, THE PHILIPPINES, AND A TAXONOMIC REASSESSMENT OF *D. TRINERVIA

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ABSTRACT

Diplycosia kitangladensis P. W. Fritsch (Ericaceae), a new species from Mindanao Island, the Philippines, is described and illustrated. This species is most similar to *D. trinervia*, but differs by its 1- or 2-flowered inflorescences and strongly urceolate corollas ca. 10 mm long that exceed the stamens by ca. 2.5 mm. The species is known only from Mt. Dulang-Dulang in the Kitanglad Range of Bukidnon Province in central Mindanao. In addition, *D. trinervia* var. *urdanetensis* is recognized at the species level, i.e., *D. urdanetensis* as originally described, on the basis of branchlet and floral distinctions from the nominate variety.

Keywords: *Diplycosia*, Ericaceae, Mindanao, narrow endemic, Philippines

INTRODUCTION

Diplycosia Blume (Ericaceae: Vaccinioideae: Gaultherieae) comprises about 115 species distributed throughout Southeast Asia and New Guinea (SLEUMER, 1967; ARGENT, 1982, 1989, 2002, 2013, 2014; FERRERAS & ARGENT, 2011). Like most species of the tribe Gaultherieae, the species of *Diplycosia* possess an accrescent fleshy mature calyx that surrounds a capsule or occasionally a berry (KRON *ET AL.*, 2002). The genus can be delimited from other genera of the tribe by the combination of a base chromosome number of $x = 18$, (usually) entire leaf margins, fasciculate inflorescences, paired apical bracteoles, and anthers with terminal tubules but with neither spurs nor disintegration tissue, among other characters. Molecular phylogenetic analyses have confirmed the monophyly of the genus but also place it as phylogenetically nested within *Gaultheria* Kalm ex L. in the Wintergreen Group clade (POWELL & KRON, 2001; BUSH *ET AL.*, 2009; FRITSCH *ET AL.*, 2011).

Eight species of *Diplycosia* are currently recognized in the Philippines, with only two of these having been described since the taxonomic treatment of the Ericaceae for the *Flora Malesiana* (SLEUMER, 1967; FERRERAS & ARGENT, 2011; ARGENT, 2013). This and the fact that species of *Diplycosia* are often restricted to a single location or very few locations suggest that more species of this genus await discovery in the Philippines (ARGENT, 2013). Four species of *Diplycosia* have been documented from the island of Mindanao (PELSER *ET AL.*, 2011 onwards), the southernmost major island of the Philippines with a particularly rich flora that is still poorly

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known (TAN & SHEVOCK, 2014). In April–May 2014 a joint botanical expedition was undertaken by researchers from the California Academy of Sciences and the CEBREM Office of Central Mindanao University to several mountain peaks in the central part of Mindanao. On one of those peaks, Mt. Dulang-Dulang in the Kitanglad Range, two collections of a *Diplycosia* species were made that appeared not to be identifiable with the key to Philippine species of the genus (ARGENT, 2013). Further study and a review of the relevant literature (SLEUMER, 1967; ARGENT, 1982, 1989, 2002, 2013, 2014; FERRERAS & ARGENT, 2011) has confirmed that this species is new to science, and is here described and illustrated. In addition, *D. trinervia* var. *urdanetensis* (Elmer) Sleumer is recognized at the species level, as originally described, on the basis of branchlet and floral distinctions from the nominate variety.

NEW SPECIES DESCRIPTION

Diplycosia kitangladensis P. W. Fritsch, **sp. nov.**
(Figs. 1 and 2)

Type: PHILIPPINES. Mindanao Island, Bukidnon Province: Municipality Lantapan, Barangay Songco, Sitio Bul-ogon, Mt. Kitanglad Range Natural Park, alternate trail to Mt. Dulang-Dulang, ridge between the Mangao and Alanib watersheds, 2510 m, 8.105139°N, 124.922194°E, 23 April 2014, *D.S. Penneys* 2257 (holotype: PNH!; isotypes: E!, CAS-1195552!, CMUH-00009839!, US!).

Paratypes: PHILIPPINES. Mindanao Island, Bukidnon Province: Municipality Lantapan, Barangay Songco, Sitio Bul-ogon, Mt. Kitanglad Range Natural Park, trail to Mt. Dulang-Dulang, ridge between the forks of the Alanib River, 2624 m, 8.107111°N, 124.923639°E, 22 April 2014, *D.S. Penneys* 2243 (CAS-1196404!, CMUH-00009837!, PNH!).

Diagnosis.—Haec species *Diplycosiae trinerviae* Elmer simillima, sed ab ea inflorescentiis floribus 1–2, urceolatis ca. 10 mm longis differt.

Description.—Terrestrial or epiphytic spreading shrublet to 0.4 m long with erect to pendent branchlets. Young branchlets with scattered but often overlapping pale ferrugineous appressed to ascending \pm straight setose trichomes to 3.5 mm long, otherwise glabrous or rarely with sparse short (to 0.1 mm long) patent white trichomes; old branchlets chestnut brown, 1.5–1.9 mm wide, subterete, with epidermis non-peeling but splitting vertically. Leaves spirally arranged, with distinct wintergreen odor when crushed (fresh leaves); petiole green, 2.5–6 \times 1–1.5 mm, grooved above, with sparse pale ferrugineous setose trichomes and occasionally when young sparse short (to 0.1 mm long) white patent trichomes; lamina elliptic, the larger 4–6.3 \times 2–3 cm, 1.8–2.3 times as long as wide, subcoriaceous, both surfaces with short (to 0.14 mm long) brown subappressed glandular trichomes when very young leaving a punctate surface at maturity, much more conspicuously punctate abaxially, with trichomes usually retained abaxially and soon caducous adaxially, otherwise glabrous or with a few setae along the midvein abaxially and soon caducous; major veins raised abaxially, impressed adaxially, secondary veins 1 or 2 on each side of midvein, arching-ascending to the apex, distinctly visible on both surfaces, if 1-paired then arising 2–8 mm above base, if 2-paired then lower pair arising 1–5 mm and upper pair arising 2–20 mm above base, upper pair often with one lateral arising well above the other, transverse lateral secondary veins from the midvein absent; base broadly cuneate to subrounded, margin entire, slightly revolute, with

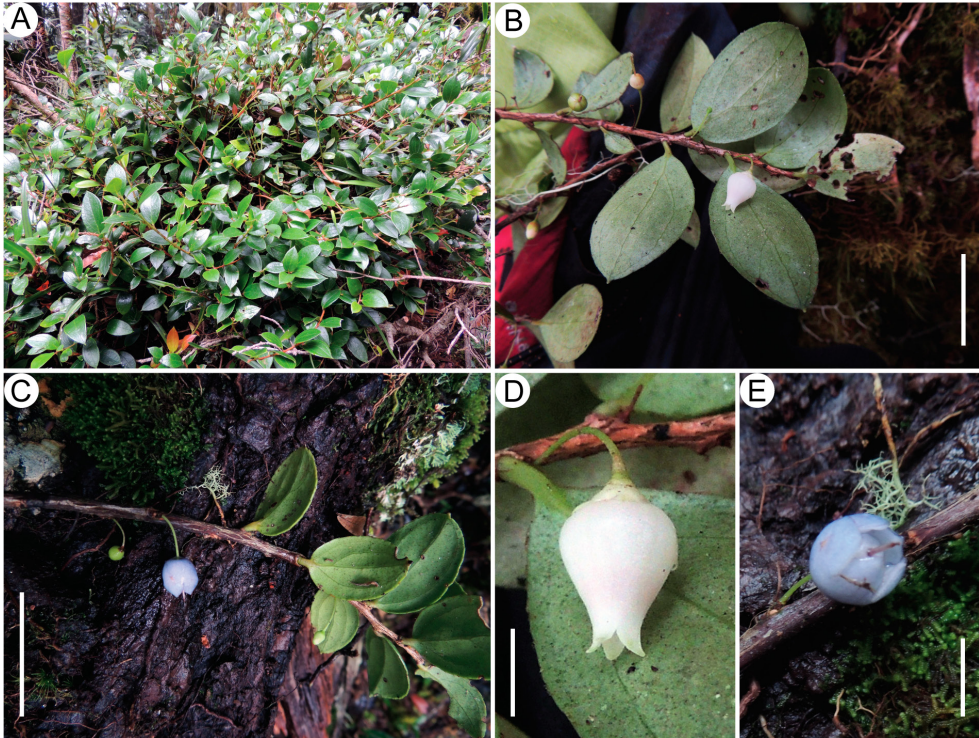


Figure 1. *Diplycosia kitangladensis* P. W. Fritsch. A, habit, growing on a log. B, branchlet with flower and flower buds. C, branchlet with immature fruit, apparently mature fruit, and flower bud (left to right). D, part of branchlet with 1-flowered inflorescence. E, part of branchlet with fruit. Scale bars: B–C = 2 cm; D–E = 5 mm. Photographs by P. W. Fritsch.

ca. 20–25 regularly spaced occasionally caducous setae to 2.5 mm long that occasionally impart a slightly serrulate appearance distally, apex acute to obtuse, the very tip apiculate for ca. 2–3 mm with thick and distinctly protruding dark gland to 1 mm long. Inflorescences axillary, fasciculate, 1- or 2-flowered; bracts deltoid-ovate, 0.5–1 × 0.7–1 mm, muriculate or puberulent or both, or glabrous. Pedicels slightly dilated apically, 5–15 (the longer 10–15) × 0.2–0.4 mm, sparsely muriculate with short (to 0.14 mm long) brown appressed or ascending glandular trichomes, otherwise glabrous; bracteoles subhemispheric, 0.8–1 mm long, glabrous except margin ciliolate with a mixture of brown glandular and patent white trichomes. Calyx pale green, 3–3.5 × 3.5–4.2 mm, glabrous except along margin with a mixture of brown glandular and patent white trichomes, the former gradually less prevalent and the latter gradually more prevalent toward apices of calyx lobes; limb 1.5–2 mm long; lobes deltoid, 1.2–1.4 × 1.5–1.6 mm. Corolla white, 5-lobed, broadly urceolate, widest below middle and strongly narrowing distally, ca. 10 × 7 mm, glabrous both outside and within; lobes recurved, narrowly deltoid, 1.2–1.5 × 1–1.2 mm, margins papillate, apices obtuse. Stamens 10, exceeded by corolla for ca. 2.5 mm, 6.5–7 mm long; filaments ± S-curved, glabrous; anthers 2.5–2.7 mm long, cells 2–2.3 mm, echinulate, tubules parallel, 0.6–0.7 mm long, smooth, pores strongly oblique, lower portions notched at edges and with a protruding rim. Nectar glands deltoid.

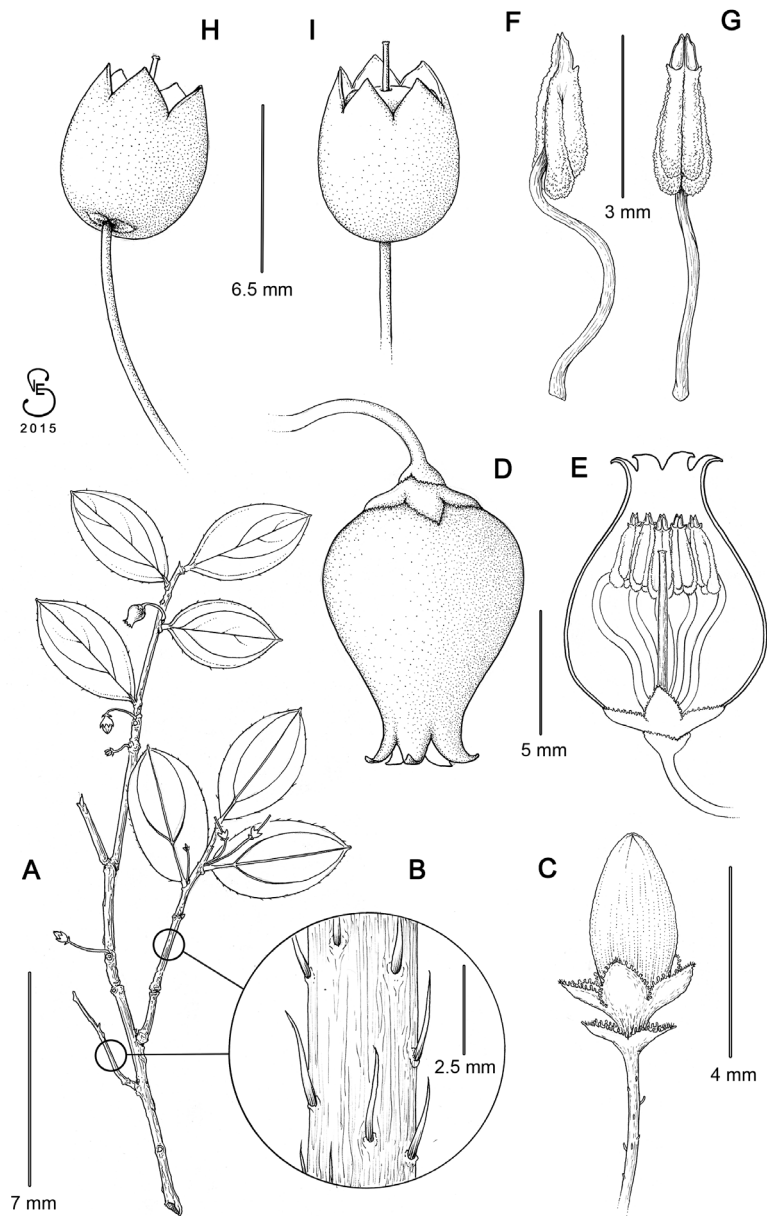


Figure 2. *Diplycosia kitangladensis* P. W. Fritsch. A, flowering branchlet. B, close-up of branchlet. C, pedicel, bracteoles and flower bud. D, pedicel, bracteoles, and flower. E, pedicel and flower with corolla cut longitudinally to show stamens and style (ovary not shown). F, stamen, lateral view. G, stamen, ventral view. H, pedicel and fruit, lateral-oblique view showing bracteoles. I, pedicel and fruit, lateral view showing part of the capsule. A–G drawn from *D. S. Penneys* 2257 (CAS) and images of the living plant; H–I drawn from *D. S. Penneys* 2243 (CAS) and images of the living plant.

Ovary broadly subspherical, ca. 1×1.2 mm, glabrous. Style 5 mm long, glabrous. Mature(?) fruiting calyx light purple, accrescent, fleshy, sub-spherical, ca. 6.5×5.3 mm; lobes erect, exceeding capsule. Capsule fleshy (but with slight lines of dehiscence apparent), lavender, not covered by calyx lobes.

Etymology.—The species is named after the Kitanglad Range, the mountains in which it was found.

Phenology.—Flowering and fruiting in April. The fruit appeared to be mature at the time of collection, with light purple color (versus ultimately turning dark purple when mature in some other *Diplycosia* species).

Distribution and habitat.—*Diplycosia kitangladensis* is known only from Mt. Dulang-Dulang, Mindanao Island, Philippines. It is rare in light gaps and partial forest shade in moss on bark of logs and low tree branches in Tropical Upper Montane Rain Forest at 2510–2624 m elevation. It was found on a south-facing 10–30% slope on volcanic-igneous substrate.

IUCN Red List Category.—*Diplycosia kitangladensis* is known from only two collections, both found along the same trail on Mt. Dulang-Dulang. As determined from GeoCAT (BACHMAN *ET AL.*, 2011), the extent of occurrence (EOO) is unknown and the area of occupation (AOO) is 4 km². Although the species is afforded some means of protection by its occurrence in Mt. Kitanglad Range Natural Park, forest clearing in the area for agriculture is an ongoing threat. In accordance with IUCN (2014) criteria, we categorize this species as Critically Endangered (CR): B2ab(iv).

DIPLYCOSIA KITANGLADENSIS VERSUS *D. TRINERVIA*

Diplycosia kitangladensis is most similar to *D. trinervia* Elmer, another species endemic to Mindanao. It is distinguished from that species by its strongly urceolate corollas (versus narrowly campanulate) ca. 10 mm long (versus 4.5–5.5 mm) that exceed the stamens by ca. 2.5 mm (versus corollas and stamens \pm equal). The original description of *D. trinervia* (Elmer, 1911) cites a corolla length of 7.5 mm, but our measurements on the open flowers of the type material available to us, i.e., two on-line images of isolectotypes (*A. D. E. Elmer* 11676a at E [barcode 00327676] and K [barcode 000780370]); it appears that the species, exclusive of *D. trinervia* var. *urdanetensis* [see below] is still only known from the type collection) yielded corolla lengths from 4.6 to 5 mm. Note also that *A. D. E. Elmer* 11676, without a letter designation, is *D. luzonica* (A. Gray) Merr., and *A. D. E. Elmer* 11676b is the type of *D. apoensis* Elmer (ELMER, 1911).

TAXONOMIC RECOGNITION OF *DIPLYCOSIA URDANETENSIS*

Two varieties of *Diplycosia trinervia* are recognized in the latest treatments that include this species (SLEUMER, 1967; PELSNER, 2011 onwards), i.e., the nominate variety and *D. trinervia* var. *urdanetensis*. The new species is most evidently distinguished from *D. trinervia* var. *urdanetensis* only by the characters in the last section, whereas it is distinguished from

the nominate variety by the additional characters of young branchlets with scattered but often overlapping appressed to ascending \pm straight setose trichomes (versus denser strongly overlapping \pm erect curled to wavy setose trichomes), subcoriaceous (versus coriaceous) leaf blades, 1- or 2-flowered inflorescences (versus 1- to 4-flowered), and pedicels sparsely muriculate with short (to 0.14 mm long) glandular trichomes (versus pubescent with longer [to ca. 0.5 mm] non-glandular trichomes).

The nominate variety of *Diplycosia trinervia* is endemic to Mt. Apo in the southeastern part of Mindanao, whereas *D. trinervia* var. *urdanetensis* is known only from the type collection on Mt. Urdaneta in the northeastern part of the island. ELMER (1915) originally distinguished *D. urdanetensis* Elmer from *D. trinervia* by a “glabrous or nearly glabrous not setose character,” presumably referring at least to the branchlets. Apparently based on no additional material than that available to Elmer, COPELAND (1932) synonymized *D. urdanetensis* under *D. trinervia*, considering the presence or density of “bristliness” referred to by Elmer a matter of degree rather than kind, although it is not clear which specimens, if any, would have demonstrated intermediacy. Finally, H. Sleumer, also based on no new material, recognized *D. urdanetensis* as a variety of *D. trinervia* (SLEUMER, 1957), citing the differences of young branchlets sparsely and \pm appressed-setose (versus \pm densely and \pm patently setose), and young pedicels muriculate (versus laxly subappressed-setulose or nearly glabrous; SLEUMER, 1967). PELSNER ET AL. (2011 onwards) has retained Sleumer’s treatment for these two entities. The notable number of differences separating *D. trinervia* var. *trinervia* from *D. trinervia* var. *urdanetensis*, i.e., young branchlets with densely overlapping \pm erect curled to wavy setose trichomes (versus scattered but often overlapping appressed to ascending \pm straight setose trichomes), coriaceous leaf blades (versus subcoriaceous), 1- to 4-flowered inflorescences [versus 1- to 2-[3-] flowered), and pedicels pubescent with long (to ca. 0.5 mm) non-glandular trichomes (versus sparsely muriculate with short [to 0.14 mm long] glandular trichome) indicates that the latter is best treated as a species, and is treated as such below.

Diplycosia trinervia Elmer, *Leafl. Philipp. Bot.* 3: 1103. 1911. **Type:** PHILIPPINES. Mindanao Island, Todaya (Mt. Apo), district of Davao, September 1909, A. D. E. Elmer 11676a (lectotype, designated by SLEUMER, 1957: US-00116838 [= accession number 872831; online image!]; isolectotypes: E-00327676!, K-000780370 [online image!], L, NY-00010004 [online image!], PNH missing).

Diplycosia urdanetensis Elmer, *Leafl. Philipp. Bot.* 7: 2628. 1915. *D. trinervia* var. *urdanetensis* (Elmer) Sleumer, *Reinwardtia* 4: 143. 1957. **Type:** PHILIPPINES. Mindanao Island, Cabadbaran (Mt. Urdaneta), Province of Agusan, September 1912, A. D. E. Elmer 13800 (lectotype, designated by SLEUMER, 1957: PNH not seen, missing; isolectotypes: A, BISH-1001422 [online image!], BO, C-10010933 [online image!], CAL, DS-0033380 [= accession number 174709]!, E-00327675, GH, HBG-515482 [online image!], K-000780371 [online image!], L, MO-345608 [= accession number 749577; online image!], NA, NY-00010005 [online image!], P-00715863 [online image!], U-0226768 [online image!], UC, US-00116839 [= accession number 894576] and US-01049935 [= accession number 3417023; online images!]).

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