



Ardisia condensiflora, a new species of Primulaceae (Myrsinoideae) from Sabah, Borneo

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Abstract

Ardisia condensiflora Julius & Utteridge, a species of Primulaceae from Tawau Hills Park, Sabah, is described as new to science. *Ardisia condensiflora* sp. nov. belongs to *Ardisia* subgenus (§) *Pyrgus* on account of specialised lateral reproductive branches bearing a terminal inflorescence subtended by foliose bracts. Morphologically, the new species mostly resembles *Ardisia singularis*, with similar lateral branch and leaf morphology, and *A. imbakensis*, in having a short inflorescence axis with densely arranged flowers, but differs from these two taxa in inflorescence morphology, as well as in additional leaf and floral size differences. *Ardisia condensiflora* is found in a protected area, but with only two collections available, it is considered rare and is preliminarily assessed here as Vulnerable (VU D2).

Key words: Ericales, Malesia, South-East Asia, subgenus *Pyrgus*, Tawau Hills Park, taxonomy

Introduction

Ardisia Swartz (1788: 48), comprising approximately 740 species (POWO 2026), is among the largest genera in subfamily Myrsinoideae of the Primulaceae (APG 2016). Using morphological characters, especially inflorescence position and shoot position, Mez (1902) recognised 14 subgenera (indicated here by the subgenus or silcrow symbol §). This classification was later expanded by the addition of three subgenera: §*Scherantha* B.C.Stone (Stone 1993), endemic to the Philippines; §*Tetrardisia* (Mez) K.Larsen & C.M.Hu (Larsen & Hu 1995); and §*Odontophylla* (Y.P.Yang) C.J.Yang & J.M.Hu (Yang & Hu 2022). These classifications were based on characters such as growth habit, leaf morphology, the arrangement of flowers at the apices of inflorescence branches (e.g., racemes, umbels, and corymbs), inflorescence position, and floral morphology. Of the recognised subgenera, ten are recorded from Borneo, and discussions on their circumscription and grouping are provided by Stone (1989a), Larsen & Hu (1995), Yang & Hu (2022) and Utteridge *et al.* (2023)

During a morphological study of *Ardisia* specimens housed at the Sabah Parks Herbarium (SNP) in 2024, conducted as part of a systematic survey of *Ardisia* §*Pyrgus* (Lour.) Mez (1902: 74), the first author encountered an unidentified specimen that did not correspond to any recognised species of *Ardisia* from Borneo, nor to any described species from South-East Asia (e.g., Stone 1989b, 1990; Hu 1999, 2002; Julius *et al.* 2020, 2021a; Utteridge *et al.* 2014). It is therefore considered a species new to science and is described below.

Materials and methods

Morphological comparison with Bornean members of the subgenus and related species, including *Ardisia singularis* B.C.Stone (1990: 31) and *A. imbakensis* Utteridge & Julius (2022: 68), was based on the examination of herbarium specimens at SAN, SAR, SING, and SNP (acronyms following Thiers 2026). Digital images of specimens were also

consulted (<http://plants.jstor.org/>; <https://www.gbif.org/>; <https://www.naturalis.nl/en/collection/botany>; <https://www.kew.org/science/collections-and-resources/collections/herbarium>). Floral measurements were taken from rehydrated material. The morphological description of the new species follows Utteridge & Julius (2022). Flowering and fruiting materials are indicated by ‘fl.’ and ‘fr.’, respectively, while the subgenus is indicated using ‘§’. A distribution map was generated using GeoCAT (<https://geocat.iucnredlist.org/editor>). The conservation assessment of the species was undertaken using IUCN threat categories (see IUCN 2012, 2024).

Taxonomic treatment

Ardisia condensiflora Julius & Utteridge, *sp. nov.* (§*Pyrgus*) (Figs. 1–2)

A member of *Ardisia* subgenus (§) *Pyrgus* on account of the terminal inflorescences on specialised lateral branches lacking regularly spaced leaves but with leaf-like bract(s) distally, and unique in the subgenus in the leaf and specialised branch leaf morphology with densely arranged flowers on a very short inflorescence, but is most similar to *Ardisia singularis* in the leaf morphology (elliptic and up to 25 cm long), but differs in several characters especially the shorter inflorescence to only 4 cm long (vs. c. 12 cm long in flower in *A. singularis*); flowers densely arranged (vs. flowers regularly spaced along the inflorescence); and the pedicels straight to slightly curved (vs. pedicels conspicuously falcate). *Ardisia condensiflora sp. nov.* is also morphologically similar to *Ardisia imbakensis* in the short inflorescence with flowers densely arranged but differs most conspicuously in the narrower leaves to 8 cm wide (vs. 12.2–16 cm wide in *A. imbakensis*) and shorter specialised lateral branches to only 6.5 cm long (vs. 13–16.5 cm long).

Type:—BORNEO. Sabah: Tawau, Tawau Hills Park, Mt. Maria, Kawah River, riverbank, 515–680 m elevation, 8 April 2014 (fl.), *Dolois S. et al. SNP 36044* (holotype SNP!).

A small shrub, 0.5–1.5 m tall. Indumentum of brown scales on leaves, straw-coloured scales on sepals, otherwise glabrous. Leaves on orthotropic (vegetative) stems spirally arranged in loose pseudo-verticils; lamina chartaceous, oblanceolate to elliptic, 20–25 × 7–8 cm, base cuneate to narrowly attenuate, oblique or equal, margin entire, apex acuminate to acute, acumen c. 1 cm long, densely covered with glandular-dots that obvious on upper surface while brown scale beneath; midrib sunken to slightly raised above, raised beneath; lateral veins 20–22 pairs, joining towards the margin, and 1(–2) intersecondary veins, distinct on both surfaces; intercostal veins faintly reticulate (obscure to the naked eye); petioles (0.5–)1–1.5 cm long, glabrous. Lateral (plagiotropic) branches (1–)3–6.5 cm long, stem, with 1 foliose inflorescence bract subtending the terminal inflorescence, oblanceolate to elliptic, (1.5–)8–18.5 × (0.8–)5–8 cm, base cuneate to narrowly attenuate, oblique or equal, margin entire, apex acuminate to acute, acumen 0.5–1 cm long, subsessile to petiolate, petiole 0.7–1.3 cm long. Inflorescences terminal on the lateral plagiotropic (reproductive) branches; rachis short, pyramidal in outline, 2–2.5 × 2.5–4 cm, branched to 2-orders, with 6–8 flowers densely arranged at the distal portion of the ultimate inflorescence branches; peduncle subsessile to 0.4 cm long (up to 1.8 cm long in fruiting), rachis 0.3–0.5 cm long (up to c. 2 cm long in fruiting), bracteole densely covered with glandular dots except along the margin abaxially, ovate 3 × 2.5–3 mm, margin transparent and undulate, apex rounded, glabrous. Flowers 5-merous, pedicel slender, 5–7 mm long, glabrous; sepals ovate, 3 × 2.5–3 mm, margin hyaline, apex rounded to obtuse, abaxially glabrous but covered with black glandular-dots, adaxially covered with dense straw-coloured scales except on margin; petals ovate-elliptic, 4–6 × 3.5–4 mm, glabrous on both surfaces, but covered with black glandular-dots throughout the surface; stamen 5, subsessile, anthers lanceolate c. 3 × 1.5 mm, connectives mucronate, thecae not locellate, dehiscent by apical pore, covered with few black glandular-dots abaxially; ovary subglobose, c. 1.5 × 1 mm, glabrous but covered with faint, black glandular-dots, ovules 27–30 arranged in multiple series, style c. 1.5 mm long with a slender stigma. Fruits blue-brown (ripe), sub-globose, 6–7 × 7–10 mm, glabrous, covered with faint, black glandular-dots on the surface.

Distribution:—Endemic and known so far from Tawau Hills Park. (Fig. 2).

Ecology:—In lowland mixed dipterocarp forest at elevations of 140–680 m, occurring in shaded areas and along riverbanks. Fruits and flowers were recorded in February and April, respectively.

Etymology:—The species epithet ‘condensiflora’ refers to the flowers along the condensed inflorescence axis.

Conservation status:—Vulnerable (VU D2). This taxon is endemic to Tawau Hills Park and is known from only two collections made in 2009 and 2014, with no additional records to date. Preliminary analysis indicates that the species could meet thresholds for Critically Endangered under criterion B; however, there is no evidence of ongoing decline, extreme fluctuations, or severe fragmentation required for a CR assessment. The species is restricted to a single

location and appears to be rare. Although it occurs within a protected area, it remains susceptible to potential threats, including stochastic events such as prolonged drought and localized disturbances from infrastructure maintenance (e.g., pathway clearance). Following IUCN guidelines, species with a very restricted distribution but without observed ongoing decline are most appropriately assessed under criterion D2. Accordingly, the species is assessed as Vulnerable (VU D2).

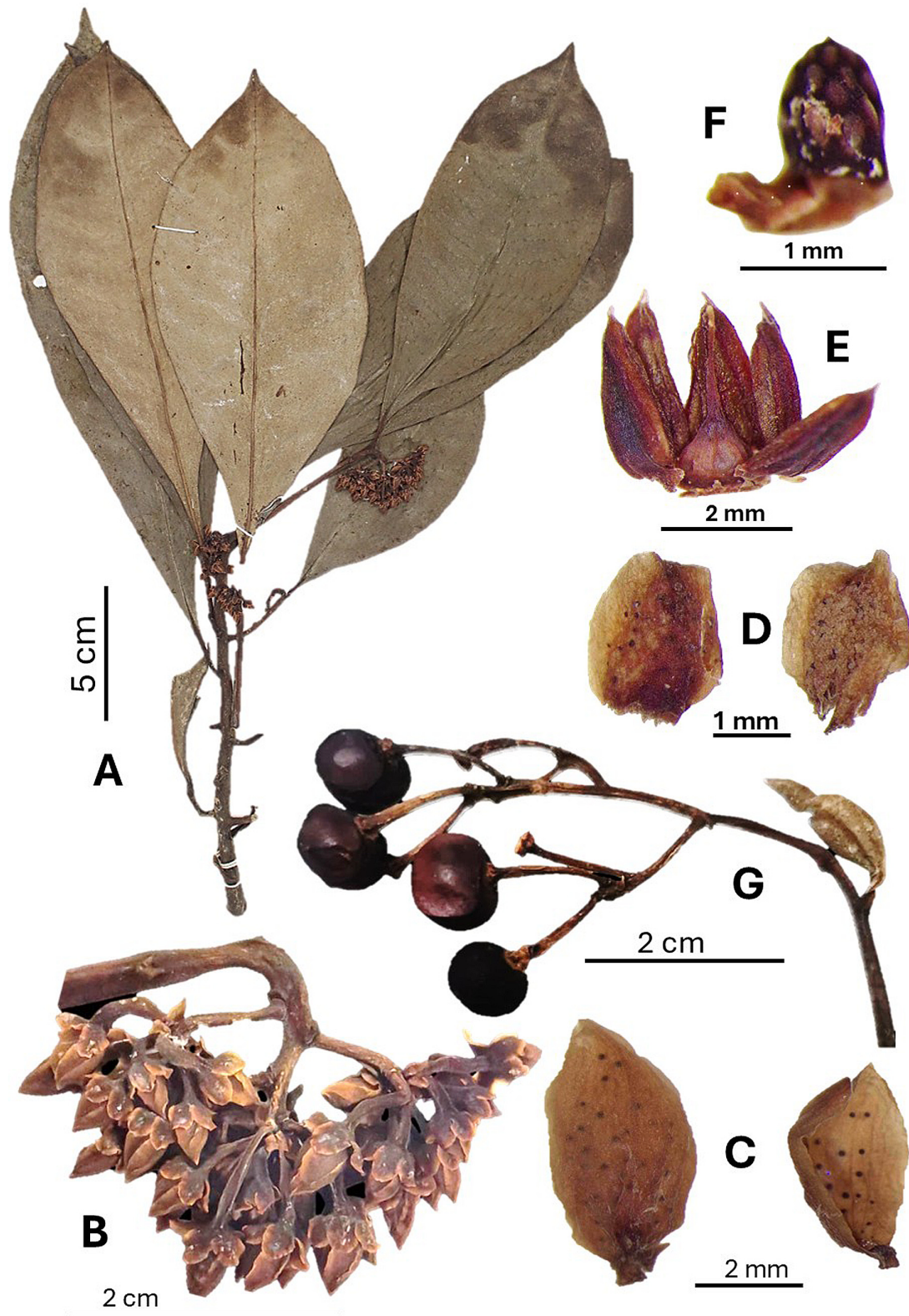


FIGURE 1. *Ardisia condensiflora* Julius & Utteridge. **A** flowering branch; **B** inflorescence; **C** petal, abaxial surface (left) and adaxial surface (right); **D** sepal, abaxial surface (left) and adaxial surface (right); **E** corolla removed showing stamen and pistil; **F** ovules; **G** infructescence. (A–F from *SNP 36044*, G from *KNP A 14728*).

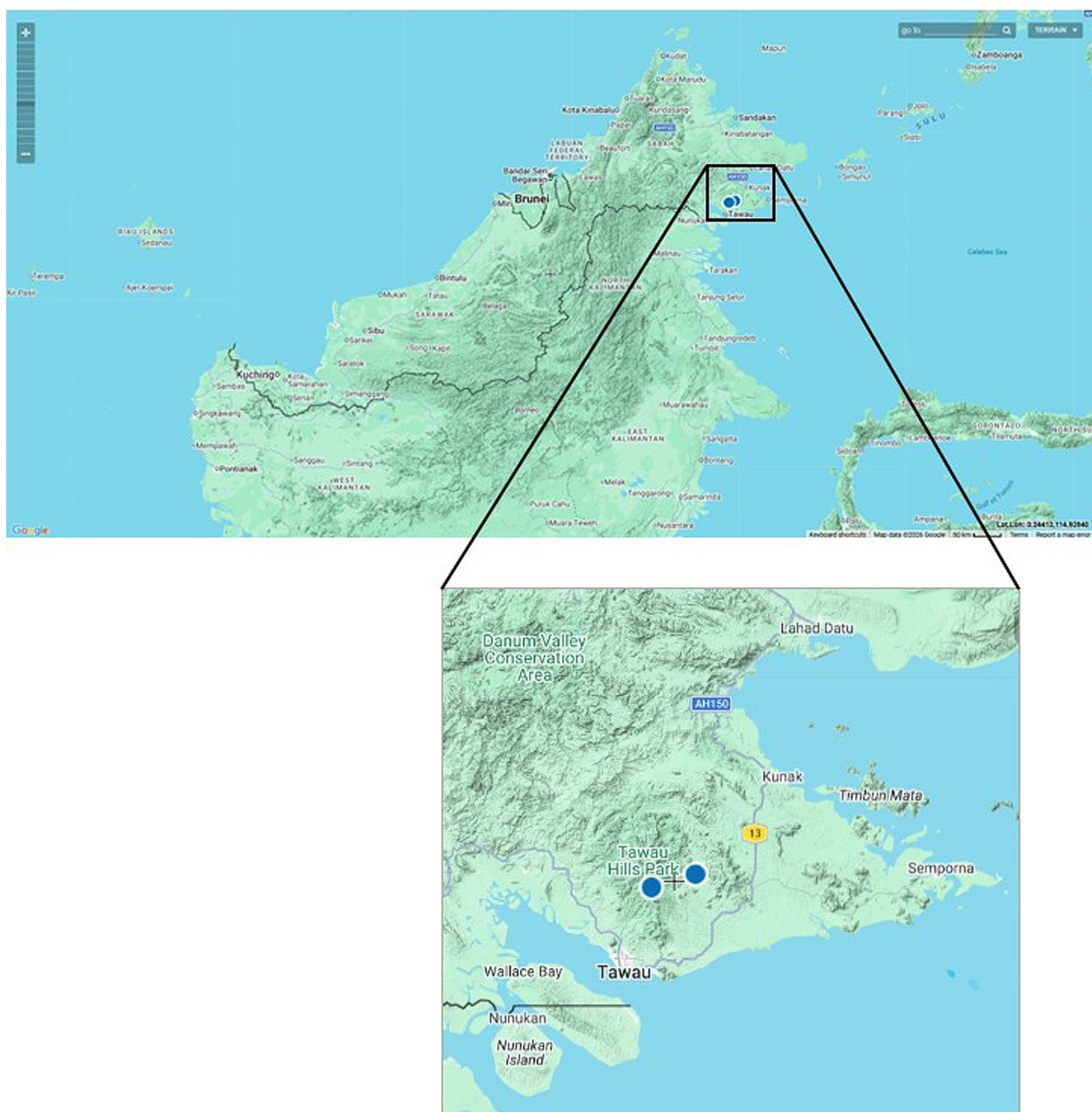


FIGURE 2. Distribution of *Ardisia condensiflora* in Tawau Hills Park. The inset shows the location of the study area in Sabah; the enlarged map indicates known occurrence points within the park.

Additional specimens examined:—MALAYSIA. Borneo, Sabah: Tawau, Tawau Hills Park, Balung, Dipterocarp plot, 4°27.885' N, 118°03.267' E, 140 m, 11 February 2009 (fr.), *Dolois S. et al. KNP A 14728* (SNP!).

Ardisia imbakensis—MALAYSIA. Borneo, Sabah, Sungai Imbak [c. 5°16'N, 117°07'E], flat land above large river, 3 July 2000, *Kiew & Sundaling RK5001* (SING! [SING0078130], holotype of *A. imbakensis*).

Ardisia singularis—INDONESIA. Borneo, Kalimantan Barat: Serawai, 1 km NE of Nanga Jelundung, 0°29'43.5"S, 112°32'3.1"E, 120 m, 26 October 1995, *Church et al. 2670* (L-image seen! [L.4162688]). Borneo, Kalimantan Tengah (Central Kalimantan): Bukit Raya, 0°45'S, 112°45'E, c. 130 m elevation, 9 Dec. 1982, *Nooteboom 4226* (L-image seen! [L.2629331]); *ibid.*, 16 Dec. 1982, *Nooteboom 4312* (L-image seen! [L.2629332]); *ibid.*, 150 m, 7 January 1983, *Veldkamp 8111* (L 2 sheets-images seen! [L.2629328; L. 2629329]). Borneo, Kalimantan Timur (East Kalimantan): Samarinda, Loa Djanan [=Janan], sandy loam on low ridge at 20-40 m alt., no date, *Kostermans 6366* (L-image seen! [L0005573], holotype of *A. singularis*; isotypes K-2 sheets n.v.); West Kutei, Mt. Palimasan near Tabang on Belajan River, acid sands, 500 m, 8 September 1956, *Kostermans 12803* (L-image seen! [L.2629334]); Selarang, Balikpapan, 16 Aug. 1974, *Soetisna U86* (L-image seen! [L.2629330]). MALAYSIA. Borneo, Sarawak, roadside about 5 km N of Serikin, along dirt road, peat swamp forest, 14 July 1997, *Cannon & Kua CHC 472* (SING! [SING0404256]); Sarawak,

1st Division, Klingkang Range, Sabal Forest Reserve, 74th Mile Kuching/Simanggang Road, Mixed dipterocarp forest, primary forest along the path to the summit of Klingkang Range, sandstone rock, 1450 m, 10 October 1979, *Yi Puan Ching S41107* (L-image seen! [L.2629333], SAR!); Sarawak, 1st Division, Kuching, Matang, Sg. Sendok, Proposed Matang National Park, kerangas forest, 8 May 1987, *Bernard Lee Meng Hock S53839* (SAR!); Sarawak, 2nd Division, Sutong, Simanggang, secondary forest near stream, 11 December 1985, *Ilias, Munting & Manggi S51548* (SAR!); Klingkang Range, Via Sabal-Balai Ringin Forest Reserve, 1°1'53.64"N, 110°57'37.26" E, Mixed dipterocarp forest, primary forest, sandy yellow clay soil, 480 m, 28 June 2000, *Julaihi et al. S83410* (SAR!).

Discussion:—With the description of *Ardisia condensiflora*, there are now nine species of *Ardisia* §*Pyrgus* in Borneo. Of these, four species are endemic to Sabah, namely the newly described taxon *A. condensiflora*, along with *A. brachythyrso* Stapf (1894: 202), *A. breviramea* Merr. (1929: 235) and *A. imbakensis*.

All known Bornean species of §*Pyrgus* have long inflorescences (> 5 cm long) except for *Ardisia condensiflora* and *A. imbakensis*, and, morphologically, *A. condensiflora* and *A. imbakensis* represent a unique group among Bornean §*Pyrgus* because of their short and densely flowered inflorescences. This shared trait sets them apart from other species of §*Pyrgus* on the island that have much longer inflorescence axes. The two taxa are unlikely to be confused. *Ardisia imbakensis* differs in the broadly elliptic leaves, 25–26 × 12.2–16 cm, longer specialised lateral branches, 13–16.5 cm long, as well as some floral characters, especially the larger ovate sepals with an acute apex (5–5.5 × 1 mm vs. 3 × 2.5–3 mm in *A. condensiflora*) and the narrowly ovate-lanceolate petals c. 3.5 × 1 mm (vs. petals ovate with obtuse apex, 4–6 × 3.5–4 mm as found in *A. condensiflora*).

Stone (1990: 32) described *Ardisia singularis*, choosing the epithet to highlight the ‘peculiar nature of the species’ and placed the species in §*Akosmos*. He noted that ‘the calyx lobes are slightly imbricate. The racemose inflorescence and its position suggest that *A. singularis* is a member of subgenus *Akosmos*.’ Overlapping calyx lobes, however, are usually found in other subgenera including §*Pyrgus* (see Utteridge *et al.* 2023), and the ‘racemose’ inflorescence is best described as a compound inflorescence with flowers racemosely arranged, and, most importantly, with more collections it is clear the inflorescence is not axillary but rather terminal on a specialised lateral shoot (and clearly visible in the type), and the species is to be assigned to §*Pyrgus*. Correct placement of species within each *Ardisia* subgenus is critical to compare related species and homologous structures. The new species described here, *A. condensiflora*, is similar to *A. singularis* in having the leaf-like bract similar in morphology to the orthotropic vegetative leaves, but differs in several characters especially the shorter inflorescence (reaching a maximum length of up to 4 cm in fruit, vs. c. 12 cm long in flower in *A. singularis*); flowers densely and subumbellately arranged at the distal end of the ultimate inflorescence branches (vs. flowers regularly spaced in a racemose arrangement along the full length of the inflorescence branches in *A. singularis*) and the pedicels straight to slightly curved, 5–7 mm long (vs. pedicels conspicuously curved distally, appearing falcate, and 10–15 mm long in *A. singularis*).

The discovery of *Ardisia condensiflora* underscores the presence of “hidden diversity” within our herbarium collections. The type specimen for *Ardisia condensiflora* was collected in 2014 but remained unidentified for 10 years until this systematic study of §*Pyrgus* was done in 2024. This implies that even in protected, and relatively well-collected areas like THP, the true diversity of *Ardisia* is still not fully documented. It emphasises the need for further taxonomic study of existing herbarium specimens, complemented by newly collected material, to improve our understanding of the flora of Borneo.

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References

- Angiosperm Phylogeny Group (APG). (2016) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants. APG IV. *Botanical Journal of the Linnean Society* 181: 1–20.
<https://doi.org/10.1111/boj.12385>

- Hu, C.M. (1999) New synonyms and combinations in Asiatic *Ardisia* (Myrsinaceae). *Blumea* 44: 391–406.
- Hu, C.M. (2002) New species of *Ardisia* (Myrsinaceae) from Malesia. *Blumea* 47: 493–512.
- IUCN. (2012) *Red List Categories and Criteria. Version 3.1. Second edition*. IUCN, Gland, Switzerland, and Cambridge, UK.
- IUCN Standards and Petition Subcommittee. (2024) Guidelines for using the IUCN Red List Categories and Criteria. Version 16. Prepared by the Standards and Petitions Subcommittee of the IUCN Species Survival Commission. Available from: <http://www.iucnredlist.org/documents/RedListGuidelines.pdf> (accessed 17 March 2026)
- Julius, A., Kajita, T. & Utteridge, T.M.A. (2020) Two new species of *Ardisia* subgenus *Tetrardisia* (Primulaceae-Myrsinoideae) from Borneo. *PhytoKeys* 145: 139–148.
<https://doi.org/10.3897/phytokeys.145.48573>
- Julius, A., Tagane, S., Kajita, T., Jerani, N.S.B., Mohamad, M.B. & Utteridge, T.M.A. (2021a) *Ardisia pyrotechnica* (Primulaceae-Myrsinoideae), a new species from Borneo. *Phytotaxa* 507: 205–210.
<https://doi.org/10.11646/phytotaxa.507.2.9>
- Julius, A., Gutiérrez Ortega, J.S., Sabran, S., Tagane, S., Naiki, A., Darnaedi, D., Aung, M.M., Dang, V.S., Ngoc, V.N., Binh, T.H., Watano, Y., Utteridge, T.M.A. & Kajita, T. (2021b) Phylogenetic study of tropical Asian *Ardisia* and relatives shows non-monophyly of generic and subgeneric classifications. *Journal of Japanese Botany* 96 (3): 149–165.
- Larsen, K. & Hu, C.M. (1995) Reduction of *Tetrardisia* to *Ardisia*. *Nordic Journal of Botany* 15: 161–162.
<https://doi.org/10.1111/j.1756-1051.1995.tb00134.x>
- Larsen, K. & Hu, C.M. (1996) Myrsinaceae. In: Smitinand, T. & Larsen, K. (Eds.) *Flora of Thailand* 6 (2). pp. 82–151.
- Merrill, E.D. (1929) Plantae Elmerianae Borneenses. *University of California Publications in Botany* 15: 1–316.
- Mez, C. (1902) Myrsinaceae. In: Engler, A. (Ed.) *Das Pflanzenreich, Heft 9, IV. Fam. 236*. Verlag von Wilhelm Engelmann, Leipzig, pp. 1–473.
- POWO. (2026) Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet. Available from: <http://www.plantsoftheworldonline.org/> (accessed 28 January 2026)
- Stapf, O. (1894) On the Flora of Mount Kinabalu, in North Borneo. *Transactions of the Linnean Society of London, Botany* 4: 69–263.
<https://doi.org/10.1111/j.1095-8339.1894.tb00044.x>
- Stone, B.C. (1989a) Myrsinaceae. In: Ng, F.S.P. (Ed.) *Tree Flora of Malaya* 4. Longman Malaysia, pp. 264–284.
- Stone, B.C. (1989b) New and noteworthy Malesian Myrsinaceae, III. On the genus *Ardisia* Sw. in Borneo. *Proceedings of the Academy of Natural Sciences of Philadelphia* 141: 263–306.
- Stone, B.C. (1990) Studies in Malesian Myrsinaceae, V. Additional new species of *Ardisia* Sw. *Proceedings of the Academy of Natural Sciences of Philadelphia* 142: 21–58.
- Stone, B.C. (1993) New and noteworthy Malesian Myrsinaceae, VI. *Scherantha*, a new subgenus of *Ardisia*. *Pacific Science* 47: 276–294.
- Swartz, O. (1788) *Nova Genera & Species Plantarum seu Prodrum*. M. Swederi, Holmiae [Stockholm], Upsaliae [Uppsala] & Aboae [Abo], 152 pp.
<https://doi.org/10.5962/bhl.title.4400>
- Thiers, B. (2026 [continuously updated]) Index Herbariorum: a global directory of public herbaria and associated staff. The New York Botanical Garden, New York. Available from: <http://sweetgum.nybg.org/science/ih/> (accessed 22 March 2026)
- Utteridge, T.M.A. & Julius, A. (2022) *Ardisia imbakensis* (Primulaceae)—A remarkable new large leaved species from Imbak Canyon, Sabah, Malaysian Borneo. *Acta Phytotaxonomica et Geobotanica* 73: 67–71.
<https://doi.org/10.18942/apg.202113>
- Utteridge, T.M.A., Julius, A. & Suzana, S. (2014) *Ardisia silamensis*, a new ultramafic species from Borneo; studies in Malaysian Myrsinaceae II. *Kew Bulletin* 69: article 9510.
<https://doi.org/10.1007/s12225-014-9510-4>
- Utteridge, T.M.A., Sabran, S. & Julius, A. (2023) *Ardisia* (Primulaceae—Myrsinoideae) in northern Borneo: an introductory identification primer. *Sandakania* 24: 48–62.
- Yang, C.-J. & Hu, J.-M. (2022) Molecular phylogeny of Asian *Ardisia* (Myrsinoideae, Primulaceae) and their leaf-nodulated endosymbionts, *Burkholderia* s.l. (Burkholderiaceae). *PLoS ONE* 17: e0261188.
<https://doi.org/10.1371/journal.pone.0261188>