

New and noteworthy records of spermatophytes in the Wallacea region

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ABSTRACT. Some new and noteworthy records of spermatophytes in the Wallacea region are presented. These include three new species records in Wallacea for *Lasianthus chrysotrichus* Lauterb. (Rubiaceae), *Medinilla medinilliana* (Gaudich.) Fosberg & Sacht (Melastomataceae) and *Thottea tomentosa* (Blume) Ding Hou (Aristolochiaceae); new collection records for *Pandorea pandorana* (Andrews) Steenis (Bignoniaceae) for both Sulawesi and Buru (Maluku Archipelago); a new record in Sulawesi for *Aeschynanthus amboinensis* (Merr.) Mendum (Gesneriaceae); extended distributions in Sulawesi for six species: *Ficus lawesii* King (Moraceae), *Gaultheria celebensis* (J.J.Sm.) Kron & P.W.Fritsch (Ericaceae), *Gaultheria hendrianiana* (Argent) Kron & P.W.Fritsch (Ericaceae), *Gaultheria retusa* (Sleumer) Kron & P.W.Fritsch (Ericaceae), *Calanthe stenocentron* (Schltr.) M.W.Chase et al. (Orchidaceae) and *Rhododendron torajaense* Craven (Ericaceae); and an extended distribution in Maluku for *Begonia aptera* Blume (Begoniaceae). The morphology of the poorly documented Sulawesi endemic *Gaultheria celebensis* (J.J.Sm.) Kron & P.W.Fritsch is discussed.

Keywords. Maluku Archipelago, seed plants, Sulawesi, taxonomy

Introduction

Over the last five years, new identifications of plant collections from the Wallacea region, which consists of Java, Philippines, Sulawesi, Lesser Sunda Islands and the Maluku Archipelago (Van Welzen & Raes, 2011), have led to the discovery of many new distribution records and range extensions, either at the genus or species level. These include: 1) New records for the Philippines: *Athyrium nakanoi* Makino (Athyriaceae) (Coritico et al., 2019), *Cymbidium sigmoideum* J.J.Sm. (Orchidaceae) (Naive et al., 2020), *Hoya sipitangensis* Kloppenb. & Wiberg (Apocynaceae) (De los Angeles et al., 2021), *Phyllanthus securinegoides* Merr. (Phyllanthaceae) and *Rinorea niccolifera* Fernando (Violaceae) (Romeroso et al., 2021), and *Pinanga lepidota* Rendle (Arecaceae) (Fernando et al., 2020). 2) New records for Sulawesi: *Gaultheria retusa*

(Sleumer) Kron & P.W.Fritsch (Ericaceae) (Mustaqim & Ardi, 2019), *Platynerium grande* (Fée) Kunze (Polypodiaceae), which is also a new generic record (Darnaedi & Clayton, 2020), *Cratoxylum cochinchinense* (Lour.) Blume (Hypericaceae) (Mustaqim & Amboupe, 2020), and *Hoya ischnopus* Schltr. (Apocynaceae) (Ahmad et al., 2021). 3) New record for the Lesser Sunda Islands of *Scindapsus hederaceus* Miq. (Araceae) (Erlinawati et al., 2019) and a range extension in the Lesser Sunda Islands is recorded for *Chloothamnus schmutzii* (S.Dransf.) Widjaja (Damayanto et al., 2020). 4) New records for the Maluku Archipelago, specifically Buru: *Codonoboea kjellbergii* (B.L.Burt) Karton. (Mustaqim, 2018), *Hoya anulata* Schltr. (Apocynaceae) (Mustaqim et al., 2018), and *Bulbophyllum cruciatum* J.J.Sm. and *Dendrobium bicaudatum* Schltr. (Orchidaceae) (Mustaqim & Astuti, 2019).

In this paper, we report several additional new and noteworthy records of flowering plants in this region based on herbarium study and the findings of recent field trips.

Materials and methods

The herbarium materials for study and identification are from BO and CEB, supported by digital herbaria (K, L) (abbreviations follow Thiers, continuously updated), with additional specimens collected during fieldwork between 2014 and 2019 in Sulawesi and Buru Island, Maluku. Type specimens were also accessed from JSTOR Global Plants (<http://plants.jstor.org>). The accepted names were checked using Plants of the World Online (POWO, 2021), TROPICOS (2021) and IPNI (2021). The taxa are presented alphabetically by family, genus and species. The typification of some of the names here presented requires further work by specialists in each of these plant groups. Additional specimens studied are presented in Appendix 1.

The new records

1. ARISTOLOCHIACEAE

1.1. *Thottea tomentosa* (Blume) Ding Hou, *Blumea* 27(2): 328, f. 48, 49 (1981); Hou, *Fl. Males.*, ser. 1, 10: 79 (1984); Yao, *Fl. Pen. Malaysia* 5: 43 (2015). – *Ceramium tomentosum* Blume, *Bijdr. Fl. Ned. Ind.* 17: 1135 (1827). – *Bragantia tomentosa* (Blume) Blume, *Enum. Pl. Javae* 1: 82 (1827); Ridley, *J. Straits Branch Roy. Asiat. Soc.* 57: 89 (1910); Ridley, *J. Straits Branch Roy. Asiat. Soc.* 59: 161 (1911). – *Apama tomentosa* (Blume) Engl. ex Soler., *Naturl. Pflanzenfam.* 3(1): 272 (1889); Backer & Bakhuizen f., *Fl. Java* 1: 162 (1964). – TYPE: [Indonesia], Java, *Herb. Blume '1690'* (lectotype L [L0038821], designated by Hou (1981); isolectotype L [L0038822]). (Fig. 1)



Fig. 1. *Thottea tomentosa* (Blume) Ding Hou. From Bawean, East Java. (Photo: W.A. Mustaqim)

Specimen examined. INDONESIA: **Sulawesi Tenggara:** Kolaka Regency, Mangolo Forest Reserve, 3 Feb 2017, *Ardi WI 132* (BO).

Notes. *Thottea tomentosa* is a small perennial herb previously known from India to Vietnam, West Malesia (except Borneo) and the Philippines. It can be recognised by the few leaves (1–5), the racemose inflorescence borne from the base of the stem, and anthers arranged in a single whorl of six (Hou, 1981, 1984; Yao, 2015). A specimen that fits the morphology of this species was collected from the Kolaka Regency, Southeastern Sulawesi Province in 2017. *Thottea tomentosa* is the second *Thottea* species to have been found east of Wallace’s Line. The first one is *Thottea celebica* Ding Hou, once thought to be endemic to Sulawesi (Hou, 1981, 1984), but since also discovered in the Andaman Islands (Murugan, 2011). *Thottea tomentosa* differs from *T. celebica* in many characters (Hou, 1984; Murugan, 2011): stem creeping at the base and erect to erecto-patent upwards (vs erect), elliptic-ovate to suborbicular leaves (vs elliptic-oblong) that are mostly shorter ((4–)7–18(–24) vs 22.5–32 cm) and with fewer lateral veins (4–9 vs c. 10 pairs), flowers with perianth yellow-orange (vs dark purplish red), and smaller stamens (up to 12.5 × 16 mm vs 25 × 30 mm) in one row (vs two rows in *T. celebica*).

2. BEGONIACEAE

2.1. *Begonia aptera* Blume, Enum. Pl. Javae 1: 97 (1827); Ardi et al., Phytotaxa 381(1): 28 (2018). – *Diploclinium apterum* (Blume) Miq., Fl. Ned. Ind. 1(1): 691 (1856). – TYPE: [Indonesia], Celebes [Sulawesi], [Sulawesi Utara Province], Tondano, *Unknown collector s.n.* (lectotype L [Herb. Lugd. Bat. 898194-39], designated by Hughes, 2008). (Fig. 2)

Specimen examined. INDONESIA: **Maluku:** Buru, Fena Leisela, Waegrahi, north of Lake Rana, c. 800 m, 25 Mar 2014, *Mustaqim & Buton EKS 20* (BO).

Notes. *Begonia aptera* is a herbaceous plant that is characterised by an erect habit, leaf lamina oblong to elliptic or broadly elliptic, staminate flowers with four tepals, pistillate flowers with five or six tepals, and fleshy fruits. This set of characters distinguishes *Begonia aptera* from other species in Maluku (Ardi & Thomas, 2015). This species has a wide geographic distribution ranging from Sulawesi to New Guinea (Ardi et al., 2018; Thomas et al., continuously updated). In Sulawesi, this species is very common (see also Ardi et al., 2018), but it is a new record for Buru Island, where it is only known from a single location in the central part of the island (Fig. 2). The plant was found growing in a humid area near a small stream at an elevation of about 800 m. In 2014, the site was found to be threatened by minor logging activities.

3. BIGNONIACEAE

3.1. *Pandorea pandorana* (Andrews) Steenis, Bull. Jard. Bot. Buitenzorg, ser. 3, 10: 198 (1928); Herklots, Fl. Trop. Clim.: 69, f. 91 (1976). – *Bignonia pandorana* Andrews, Bot. Repos. 2: t. 86 (1799). – *Tecoma pandorana* (Andrews) Skeels, Bull. Bur. Pl. Industr. U.S.D.A. 282: 62 (1913). – *Campsis pandorana* (Andrews) Steenis, Fl. Males., ser. 1, 4: xxi (1948). – TYPE: Not traced. (Fig. 3)

Specimens examined. INDONESIA: **Sulawesi Selatan:** Soroako-Wasuponda road (2°15'S–3°S 121°E–121°45'E), 7 Jul 1979, *Van Balgooy 3915* (BO). **Maluku:** Buru, NW Buru, c. 10 km S of Bara, 650 m, 4 Jul 1984, *Van Balgooy 5046* (L [L.2820281]); Buru Selatan, Liang Village, north of Leksula, 570 m, 29 Apr 2014, *Mustaqim 188* (FIPIA).

Notes. *Pandorea pandorana* is a woody climber that can be found in the Lesser Sunda Islands (Timor, East Nusa Tenggara), New Guinea, Australia, and the Pacific Islands. This species can be recognised by the plain venation on the upper surfaces of the leaves, the glabrous outer surfaces of the corolla, the absence of a hair ring on the inner side of the corolla tube near the stamen insertion, and the presence of glands at the base of the filaments (Van Steenis, 1977). One specimen was collected by the Dutch botanist M.M.J. van Balgooy in 1979 (*Van Balgooy 3915*) from along the Soroako-Wasuponda road and is the first record for Sulawesi. In Maluku, this species is otherwise known from most larger islands but has not been formally reported from



Fig. 2. *Begonia aptera* Blume. From Buru Island, Maluku Archipelago. (Photo: W.A. Mustaqim)



Fig. 3. *Pandorea pandorana* (Andrews) Steenis. From Buru Island, Maluku Archipelago. (Photo: W.A. Mustaqim)

Buru Island. Two specimens have been collected from Buru Island, *Van Balgooy 5046* from the northwestern part of the island, south of Bara village, and one by the first author in 2014 from the southern part. Both were collected from limestone habitats at 570 to 650 m above sea level.

4. ERICACEAE

4.1. *Gaultheria celebensis* (J.J.Sm.) Kron & P.W.Fritsch, Gard. Bull. Singapore 72(2): 305 (2020). – *Diplycosia celebensis* J.J.Sm., Bull. Jard. Bot. Buitenzorg, ser. 3, 1: 406, t. 53 (1920); Smith, Bot. Jahrb. 68: 205 (1937); Sleumer, Reinwardtia 4: 50 (1957); Sleumer, Fl. Males., ser. 1, 6: 730 (1967); Argent, Edinburgh J. Bot. 71(1): 93 (2015). – TYPE: [Indonesia], C Celebes [Sulawesi Selatan], G Sinadji (N of Makale and Rantepao), *Rahmat 884* (holotype BO; isotype L). (Fig. 4)

Specimen examined. INDONESIA: **Sulawesi Barat**: Mamasa Regency, Tabang, near road from Mamasa to Toraja, 1750 m, 21 Nov 2019, *Ardi et al. 481* (BO).

Notes. *Gaultheria celebensis* is among the most morphologically variable species of *Gaultheria* sect. *Diplycosia* Kron & P.W.Fritsch (Kron et al., 2020) in Sulawesi. This species is similar to a west Malesian widespread species, *Gaultheria heterophylla* Zoll. & Moritzi (Argent, 2014; Kron et al., 2020). The morphological variation of the species is not fully understood due to the lack of information in the available materials (Argent, 2014). During a field trip in Mamasa Regency, Sulawesi Barat Province in 2019, we collected a plant that matches the morphology of *Gaultheria celebensis*. However, there are some quite notable differences, mainly in the size of the floral parts, compared to Argent (2014): longer corolla lobes (c. 2.5 mm vs 1.5–2 mm in Argent, 2014), longer filaments (up to 4 mm vs up to 3.5 mm long), longer tubules (up to 2.5 mm vs c. 1.5 mm long), and longer style (up to 6 mm vs 4–5.5 mm). Argent (2014) also highlights in his description from his observation in the Royal Botanic Garden Edinburgh that the white colour of the corolla can be flushed green to green-purple. Our plant has a white corolla flushed purple, with the lobes quite distinctly purple all over, more or less equal to the original description of the species (Smith, 1920; Argent, 2014). This species is now considered widespread in central Sulawesi, known already from Mount Sojol, Latimodjong Range (Sinadji, Batudung, Tinabábang and Pokapindjang), and now also found in Mamasa Regency. In Mamasa, the plant was discovered at a lower elevation than usual (1750 m vs 2400–3000 m in other locations).

4.2. *Gaultheria hendrianiana* (Argent) Kron & P.W.Fritsch, Gard. Bull. Singapore 72(2): 306 (2020). – *Diplycosia hendrianiana* Argent, Edinburgh J. Bot. 71(1): 103 (2015). – TYPE: Indonesia, Central Sulawesi, [Sulawesi Tengah Province], Mt Sojol, 27 February 2000, *G. Argent, M. Mendum & Hendrian 00189* (holotype BO; isotype E). (Fig. 5)



Fig. 4. *Gaultheria celebensis* (J.J.Sm.) Kron & P.W.Fritsch. **A.** Leafy twigs. **B.** Flower. (Photos: W.A. Mustaqim)

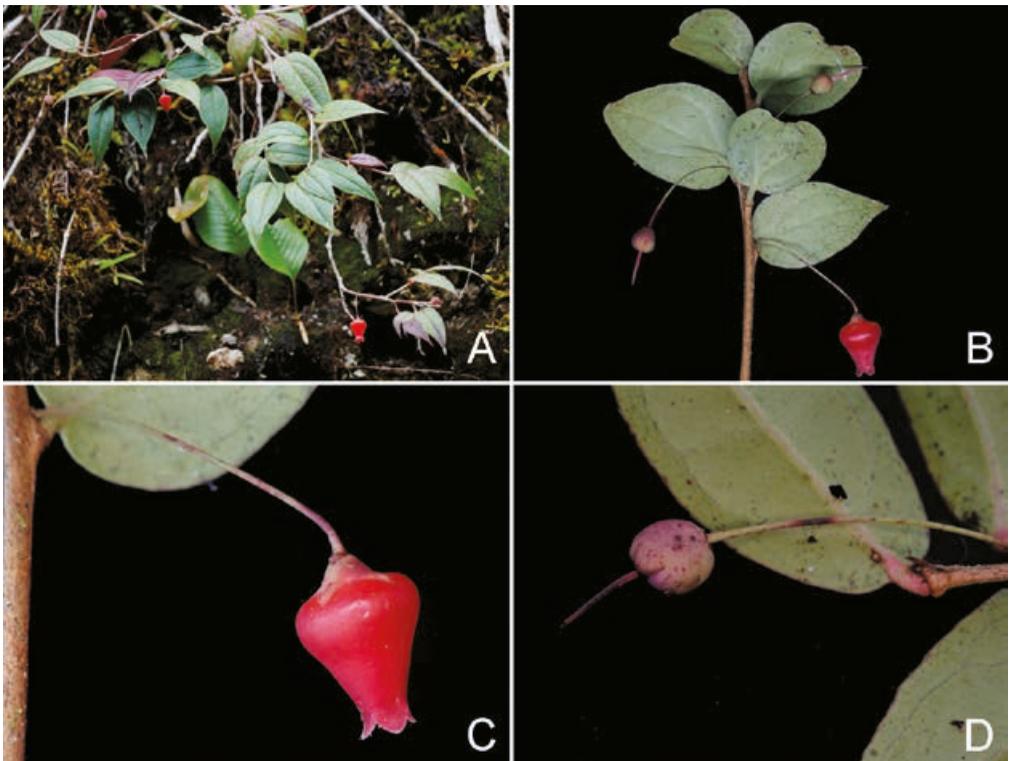


Fig. 5. *Gaultheria hendrianiana* (Argent) Kron & P.W.Fritsch. **A.** Living plant. **B.** Flower-bearing branch. **C.** Flower. **D.** Immature fruit. (Photos: W.H. Ardi)

Specimen examined. INDONESIA: **Sulawesi Tengah:** Poso Regency, Tentena-Bada road divide, 1791 m, 7 Mar 2020, *Hutabarat PW 478* (BO).

Notes. *Gaultheria hendrianiana* was previously only known from Mount Sojol, in the west part of the northern arm of Sulawesi (Argent, 2014). It is a member of *Gaultheria* sect. *Diplycosia* (Kron et al., 2020). During a recent trip to the Tentena-Bada road divide, a few individuals that match the morphology of this species were collected. Despite being a lithophyte, the morphology of the specimens still fits the species description of Argent (2014; as *Diplycosia hendrianiana*) and can be distinguished from other Sulawesi *Gaultheria* by the following characters: the presence of bristles and simple, minute patent hairs along the young twigs, the flower pedicels longer than 6 mm, and leaves that are more than 15 mm wide and with rounded bases. The most similar species is *Gaultheria pilosa* Zoll. & Moritz, which has branchlets with bristles and is densely covered with fine hairs, and ovate or long-ovate leaves with rounded bases; however, *G. hendrianiana* differs in having a red corolla (vs green in *G. pilosa*) and longer pedicels (10 mm or longer vs up to 7 mm). In Sulawesi, the most similar species is *Gaultheria balgooyi* (Argent) Kron & P.W.Fritsch, which differs by its cuneate leaf base (vs rounded in *G. hendrianiana*) and narrower leaves (10–15 mm vs at least 15 mm wide) (Argent, 2014). This finding represents a notable extension of the geographic distribution, as the new location (see above) is located around 265 km south of the known population on Mount Sojol.

4.3. *Gaultheria retusa* (Sleumer) Kron & P.W.Fritsch, Gard. Bull. Singapore 72(2): 312 (2020). – *Diplycosia retusa* Sleumer, Bot. Jahrb. Syst. 71(1): 156 (1940); Sleumer, Reinwardtia 4: 152 (1957); Sleumer, Fl. Males., ser. 1, 6: 733 (1967); Argent, Edinburgh J. Bot. 71(1): 109 (2015). – TYPE: [Indonesia], Central Sulawesi [Sulawesi Tengah], Topapu Mts [2°0'S 120°15'E], 1300–1700 m, 17 September 1902, *Sarasin 2097* (holotype B destroyed; isotype L, fragment) (Fig. 6)

Specimen examined. INDONESIA: **Sulawesi Barat:** Mamasa Regency, road to Talambai, 1895 m, 25 Nov 2019, *Ardi et al. 585* (BO).

Notes. *Gaultheria retusa* is a clambering shrub endemic to the central part of Sulawesi. *Gaultheria retusa* can be recognised by the sub-clambering habit, glabrous twigs, obovate leaf blades, 1-flowered inflorescences, flowers borne on long and almost filiform pedicels of c. 15 mm long, and a quite large corolla, c. 10 mm long (Sleumer, 1967; Argent, 2014; Mustaqim & Ardi, 2019; Kron et al., 2020). During our trip to the mountain range of SW Central Sulawesi, towards the Talambai village, Mamasa Regency, we found a few plants of this species, which was previously known only from Topapu and the Tentena-Bada Divide. Our finding represents an important extension of the geographic distribution of the species.



Fig. 6. *Gaultheria retusa* (Sleumer) Kron & P.W.Fritsch. **A.** Flowering branchlets. **B.** Flower (side view). **C.** Flower (apical view). (Photos: W.A. Mustaqim)

4.4. *Rhododendron torajaense* Craven, J. Adelaide Bot. Gard. 27(4): 30 (2014); Argent, *Rhododendrons Vireya*, 2nd ed.: 346 (2015). – TYPE: Indonesia, Sulawesi Selatan, Tana Toraja, Batutumonga, on way to Gunung Sesean, 12 July 2002, G. Brown, L. Craven & L. Juswara 78 (holotype BO; isotype CANB) (Fig. 7)

Specimen examined. INDONESIA: **Sulawesi Barat:** Mamasa Regency, near city center (2°56'38.6"S 119°22'24.7"E), 1140 m, 28 Nov 2019, *Ardi et al.* 622 (BO).

Notes. *Rhododendron torajaense* is a Sulawesi endemic species that is currently only known from the Mt Sesean area, Sulawesi Selatan province. During our trip to Mamasa Regency at the end of 2019, a few individuals of this species were found growing wild beside the provincial road near the city centre of Mamasa. It is a member of *Rhododendron* sect. *Schistanthe* subsect. *Euvireya* H.F.Copel (Argent, 2015). Important characters to recognise this species from other members of the subsection in Sulawesi are: pedicels up to 22 mm long, the cylindrical corolla tube less than 30 mm long and not distally expanded, and the presence of hairs on the ovary. One recorded population in Mamasa was found around 55 km west of the type locality area in Batutumonga, Mount Sesean. Craven (2014) highlighted the threats to this species, mainly from human activities on Mt Sesean. In 2020, a new road development was made to the summit area, which highly threatens the available habitat for this species. The species is also threatened in Mamasa as road maintenance could wipe it out.



Fig. 7. *Rhododendron torajaense* Craven. **A.** Inflorescence. **B.** Corolla and stamens. **C.** Gynoeceium. (Photo: W.A. Mustaqim)

5. GESNERIACEAE

5.1. *Aeschynanthus amboinensis* (Merr.) Mendum, Edinburgh J. Bot. 55(3): 363 (1998). – *Trichosporum amboinense* Merr., Philipp. J. Sci., C. 11: 313 (1916). – TYPE: [Indonesia], Moluccas [Maluku], Ambon, July 1913, *Robinson 1728* (holotype L [L0281679]; isotypes K [K000831894], P [P00606327], US). (Fig. 8)

Specimens examined. INDONESIA: **Sulawesi Utara:** Cultivated specimen collected from the wild, Sulawesi Utara Province, Gunung Klabat, 20 Jul 2021, *Ardi 762* (BO). **Sulawesi Tengah:** Toli Toli Regency, 1°04'28.37"N 120°51'19.25"E, 227 m, 28 Jul 2021, *Ahmad RPPA 043* (CEB); ibidem, *Zulfadli ZF 057* (BO); Parigi Moutong Regency, Ampibabo, 0°27'49.97"S 119°58'21.89"E, 261 m, 2 Aug 2021, *Ahmad RPPA 069* (CEB); ibidem, *Zulfadli ZF 061* (BO).

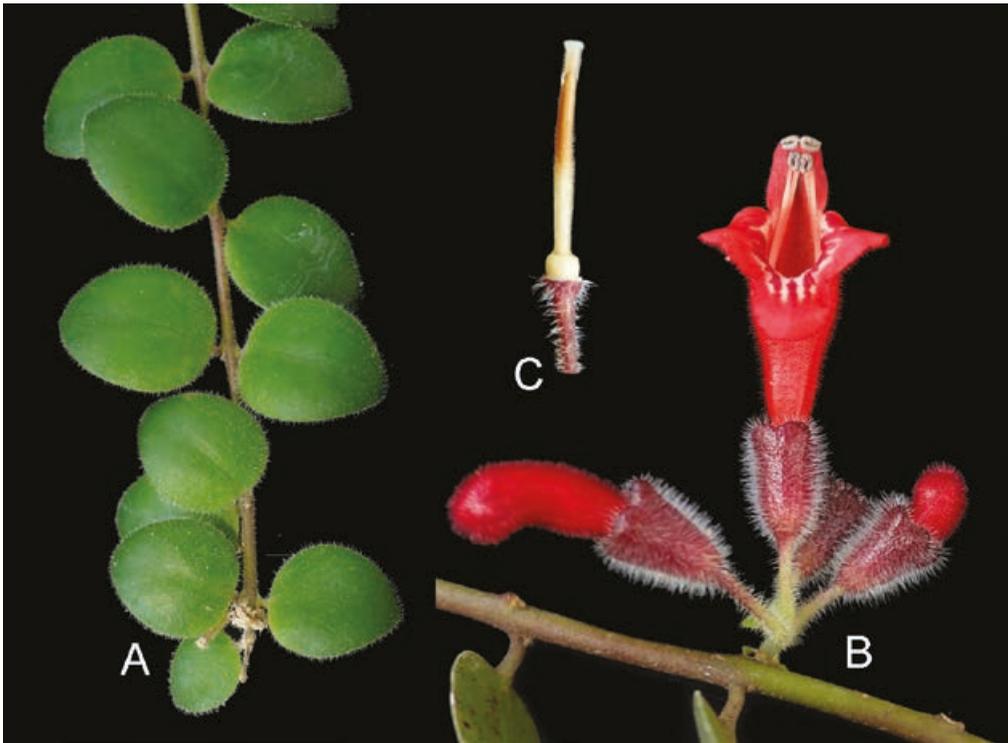


Fig. 8. *Aeschynanthus amboinensis* (Merr.) Mendum. Cultivated specimen collected from Mount Klabat, Sulawesi Utara Province. **A.** Leafy stem. **B.** Flowers. **C.** Floral disk and gynoecium. (Photos: W.H. Ardi)

Notes. *Aeschynanthus amboinensis* is an epiphytic climber previously known from Ambon and Seram that can be recognised by its small, narrowly to broadly ovate leaves (up to 4.2×2.9 cm) with rounded to cordate bases, indistinct secondary or tertiary veins, flowers with crimson pedicels and nearly globose calyx, calyx lobes with rounded apices, corolla abruptly narrowed at the level of the apex of the calyx lobes and again broadening upwards, stamens included in the corolla and borne from 1.7 cm and 2.1 cm from the base of the corolla, and ovary stalk as well as style clad with glandular hairs (Mendum, 1998). In mid-2019, a living specimen was collected from Gunung Klabat, Minahasa Utara Regency, Sulawesi Utara Province (vouchered in 2021), followed by four additional specimens collected in 2021 from Sulawesi Tengah Province, two from Toli Toli Regency and two from Parigi Moutong Regency. These are new records for the island, not mentioned in earlier literature (e.g., Mendum, 2004; Mendum & Atkins, 2004; Mendum et al., 2006; Kartonegoro & Potter, 2014). In the forest of Mount Klabat, the plant was found growing as an epiphytic climber on a tree trunk in a valley at an elevation of around 1000 m, while in Toli Toli and Parigi Moutong, this species was collected in lowland forests, at 227 m and 261 m, respectively.

6. MELASTOMATACEAE

6.1. *Medinilla medinilliana* (Gaudich.) Fosberg & Sachet, Smithsonian Contr. Bot. 45: 15 (1980). – *Melastoma medinilliana* Gaudich., Voy. Uranie: 69, 73 (1826). – TYPE: Northern Mariana Islands, *Gaudichaud s.n.* (holotype P [P00646163]). (Fig. 9)

Specimens examined. INDONESIA: **Sulawesi Utara:** Dumoga Bone NP, Bolaang-Mongondow District, vicinity of G Sinombayuga, 0°28'N 123°44'E, 1500 m, 24 Sep 1991, *Milliken 1032* (L [L.3904914]); Sempu, Sopotan Mts, 16 Jun 1954, *Alston 15842* (BO); Kabupaten Kotamobago, G Ambang near Poopo, 0°45'N 124°23'E, 1000 m, 27 Oct 1973, *De Vogel 2619* (BO); Minahasa, Batu Angus NR, Batu Angus, 1°28'N 125°12'E, 1000 m, 8 Oct 1973, *De Vogel 2478* (BO); Minahasa [Minahasa], Manado, 900 m, 9 Apr 1895, *Koorders 17861β* (BO, L [L.2539428]); Minahasa (Manado), 700 m, 8 Apr 1895, *Koorders 17860β* (BO). **Sulawesi Tenggara:** North Kolaka District, Rante Angin Subdistrict, Tinukari Village, Mekonga mountain range, Hurahura, 3°38'17.16"S 121°11'35.2"E, 1426 m, 28 Nov 2010, *Widjaja & Sudjadi EAW 9396* (BO). **Maluku:** Buru, Buru Selatan Regency, Liang Village, north of Leksula, 570 m, 29 Sep 2014, *Hidayat et al. 28* (FIPIA).

Notes. *Medinilla medinilliana* is a shrub that can be recognised by its 1–2 mm thick calyx tube and 1-flowered inflorescence, often with several from the same leaf axil (Bakhuizen van den Brink, 1943). This species is so far known only from New Guinea and the Mariana Islands (Bakhuizen van den Brink, 1943; POWO, 2021), but is here reported as new for Buru (Maluku) based on a specimen collected by the first author in 2014. According to Bakhuizen van den Brink (1943), one of the morphologically similar species is *Medinilla musofo* K.Schum. & Lauterb. with both having unequal anthers and inflorescences in fascicles; however, *M. musofo* differs by the oblong-lanceolate leaf blades (vs obovate-oblong in *M. medinilliana*) and 2- to few-flowered inflorescences (vs 1-flowered) (Bakhuizen van den Brink, 1943). There are at least seven specimens from Sulawesi and one from Maluku (Buru Island).

7. MORACEAE

7.1. *Ficus lawesii* King, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 55(4): 403 (1887); Berg, Fl. Males., ser. 1, 17(2): 663 (2005). – TYPE: New Guinea, [Papua New Guinea], Sogeri Region, *H.O. Forbes 85* (type B, BM [BM000951778], L [L0040091], MEL). (Fig. 10)

Specimen examined. INDONESIA: **Sulawesi Selatan:** Batu Goro'e, road from Maros to Bone Regency, 4 Jul 2019, *Ardi et al. 678* (BO).

Notes. This species is a large tree that can be recognised by its glabrous or white puberulous twigs with a more or less regular length of the internodes, free stipules, pedunculate figs with the apex of the peduncle not forming a rim, and figs (up to 7 mm or rarely to 10 mm across when dry) that have persistent basal bracts as well



Fig. 9. *Medinilla medinilliana* (Gaudich.) Fosberg & Sachet. From Buru Island, Maluku Archipelago. (Photo: W.A. Mustaqim)



Fig. 10. *Ficus lawesii* King. **A.** Fig-bearing twigs. **B.** Figs and stipule. (Photos: W.A. Mustaqim)

as a circular ostiole with imbricate bracts (Berg & Corner, 2005). The most similar species is *Ficus globosa* Blume, a widespread species in West Malesia also from *Ficus* subgenus *Urostigma*, in being monoecious, twig internodes not conspicuously different in length, stipule free, leaf abaxial waxy gland one, figs with elongated peduncle that has no apical rim, figs with basal bracts, ostiole circular with horizontal upper bracts, figs' interfloral bracts developed, and staminate flowers ebracteolate. *Ficus globosa* differs in having twigs with brown appressed hairs (vs glabrous or minutely white puberulous in *F. lawesii*), ostiolar bracts not or hardly imbricate (vs imbricate), and the dry figs having a larger diameter (8–12 mm vs 4–7(–10) mm). In Sulawesi, this species is similar to *Ficus microcarpa* Blume, but the latter has much smaller leaves and sessile figs (Berg & Corner, 2005).

Berg & Corner (2005) did not report the presence of this species in Sulawesi. The only available record for Sulawesi was recorded by Powling et al. (2015) in the study of the vegetation in Lambusango forest on Buton Island, a large island off the coast of mainland Sulawesi. The species has a scattered distribution in Borneo (Sarawak and Kutai), the Philippines (Luzon and Mindanao), Sulawesi (Buton Island), Maluku (Halmahera), and throughout New Guinea (Berg & Corner, 2005; Powling et al., 2015). The collection made during a mid-2019 trip to Batu Goro'e area (see above) is a new record for mainland Sulawesi.

8. ORCHIDACEAE

8.1. *Calanthe stenocentron* (Schltr.) M.W.Chase, Christenh. & Schuit., Phytotaxa 472(6): 165 (2020). – *Phaius stenocentron* Schltr., Repert. Spec. Nov. Regni Veg. 10: 68 (1911); Stone & Cribb, Lady Tankerville's Legacy (2017). – TYPE: [Indonesia], Celebes [Sulawesi], [N Sulawesi], Minahassa, Gunong Klabat, December 1909, *Schlechter 20547* (type B destroyed). (Fig. 11)

Specimen examined. INDONESIA: **Sulawesi Barat**: Mamasa Regency, Messawa, Sumarorong, 22 Nov 2019, *Ardi et al. 489B* (BO).

Notes. *Calanthe stenocentron* is a terrestrial orchid known from the Philippines and northern Sulawesi. This species can be distinguished from other *Calanthe* of Sulawesi by the short plants (less than 40 cm), leaves from upper nodes or along the elongated stem, a lateral 2-flowered inflorescence, and flowers with a distinct spur (Chen et al., 2009; Stone & Cribb, 2017; Chase et al., 2020). This species was recently found in the Mamasa Regency, Sulawesi Barat Province, which is an extension of its known geographic distribution on the island. The type material (now lost) was collected from the northern arm of the island, Mount Klabat, Minahassa Regency, Sulawesi Utara Province, around 800 km north of the current location in Mamasa. The map presented in Stone & Cribb (2017) for the Sulawesi plant is erroneous as the dot was put in the western part of the northern arm, while Mount Klabat (= Gunong Klabat in Schlechter, 1911) is located in the eastern part of the northern arm.

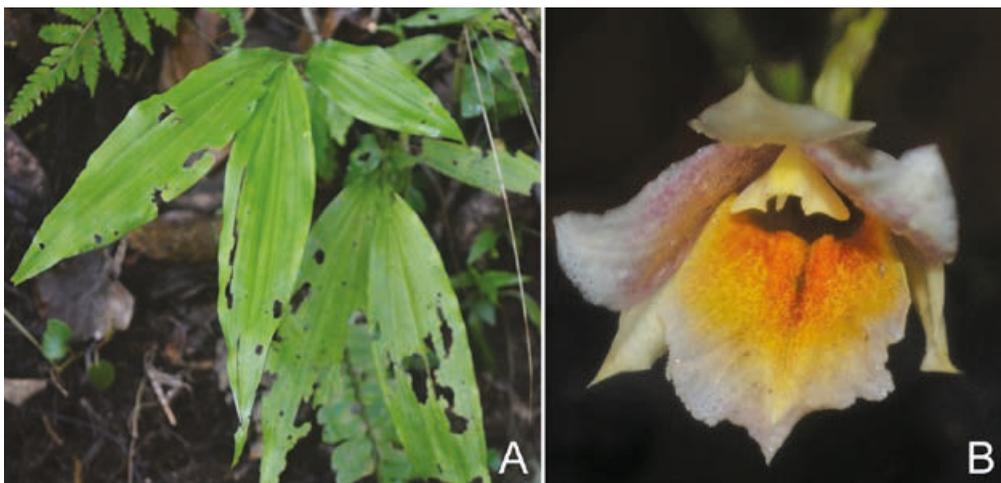


Fig. 11. *Calanthe stenocentron* (Schltr.) M.W.Chase et al. **A.** Living plant. **B.** Flower. (Photos: W.A. Mustaqim)

The specimen from Mamasa displays some differences: the petals are not pure white as typical but rather purple-tinged; the labellum has a more intense yellow coloration from the base and leaves only a small white portion at the apex; also, the labellum has many small purple dots in the yellow part. In spite of these differences, we are confident that the Mamasan plant is *Calanthe stenocentron* because colour variation in the flowers of *Calanthe* species is quite common, see, for example, *Calanthe reflexipetala* (J.J.Wood & Shim) M.W.Chase et al. and *Calanthe ferruginea* M.W.Chase et al. (Stone & Cribb, 2017; Chase et al., 2020). The vegetation, where this species was found, is lower montane forest at an elevation of around 990 m. During our field exploration it appeared that the habitat of this species is threatened by deforestation caused by the expansion of coffee plantations.

9. RUBIACEAE

9.1. *Lasianthus chrysotrichus* Lauterb. in Schumann & Lauterbach, Fl. Schutzgeb. Südsee, Nachtr. 400 (1905); Zhu et al., Blumea 57(1): 29 (2012). – TYPE: New Guinea [Papua New Guinea], 1 April 1902, *Schlechter 14576* (type BR [BR0000008486714]). (Fig. 12)

Specimen examined. INDONESIA: **Maluku:** Buru, Fena Leisela District, Waegrahi, north of Lake Rana, c. 850 m, 22 Mar 2014, *Buton & Mustaqim 23* (FIPIA).

Notes. *Lasianthus chrysotrichus* is a shrub that is characterised by the following characters: branchlets, upper midrib, and lower nerves of the leaves clad with spreading hirsute hairs, stipule 1–1.5 mm long and densely appressed hairy, leaves lanceolate with

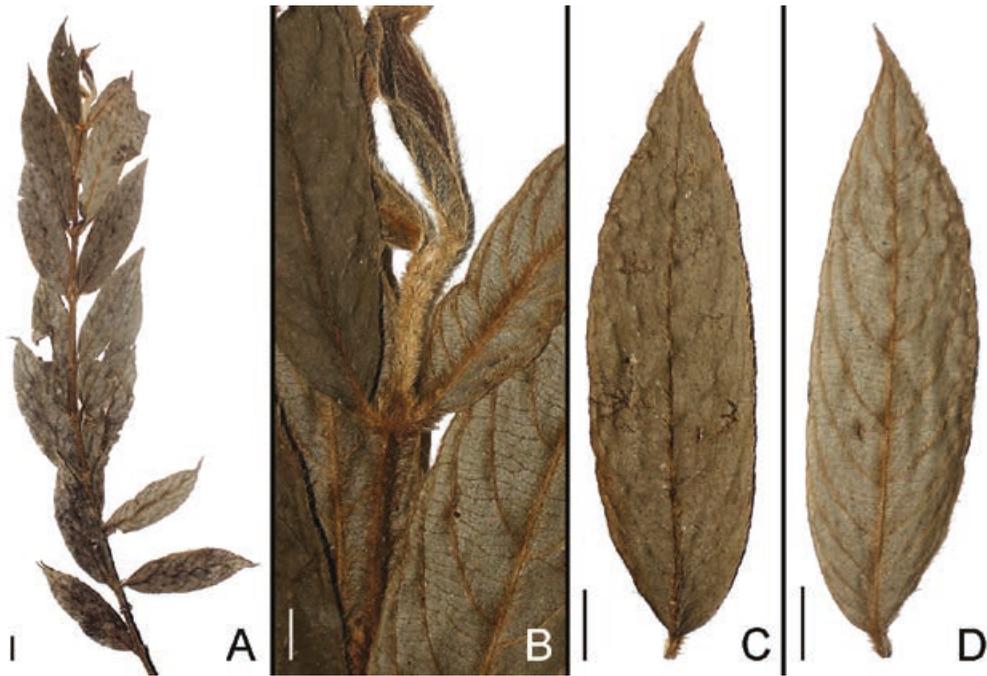


Fig. 12. *Lasianthus chrysotrichus* Lauterb. **A.** Leafy twig. **B.** Close-up of young twig. **C.** Adaxial surface of leaf. **D.** Abaxial surface of leaf. Scale bars: A, 1 cm; B, 5 mm; C, D, 1 cm. (Photos: W.A. Mustaqim)

blades 5–9 cm long and with 6–8 lateral nerves that are not looped, flowers arranged in sessile cymes and each with less than 1 mm long pedicels, linear inflorescence bracts, calyx divided to the base with conspicuous and lanceolate lobes, hairy globose or subglobose drupe with four pyrenes (Zhu et al., 2012). This species was only known from New Guinea and the current report from Buru Island, Maluku Archipelago, is the first for the Wallacea region. In Buru, this species resembles *Lasianthus sogerensis* Wernham, but that species can be distinguished by branchlets with spreading villous hairs (vs spreading hirsute in *L. chrysotrichus*), leaf apex cuspidate-acuminate (vs acute), nerves 8–11 pairs (vs 6–8), inflorescence with leaf-like bracts (vs linear), longer calyx tube (c. 3 mm vs 1.5–2 mm), longer corolla tube (c. 5 mm vs c. 4 mm), and corolla tube villous outside throughout (vs hirsute in the upper half). It is also similar to *Lasianthus hirtus* Ridl. in general morphology, but the latter can be easily recognised by the conspicuous and ovate, 3–4 mm long stipules (vs inconspicuous and triangular, 1–1.5 mm long in *L. chrysotrichus*), densely pilose adaxial leaf surfaces (vs hirsute on midrib only), cyme bracts absent (vs present), perianth 4-merous (vs 5-merous), and ellipsoid drupes (vs subglobose) (Zhu et al., 2012). The plant from Buru Island was collected from the central mountain area, north of Lake Rana, at an elevation of about 850 m. The habitat is a relatively undisturbed forest with a thick litter layer on the floor.

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APPENDIX 1. List of additional specimens used for identification and morphological comparisons.

- Aeschynanthus amboinensis* (Merr.) Mendum: *Buwalda* 5946; *M. Kato et al. C-12368*; *Rutten* 179, 1568.
- Begonia aptera* Blume: *Ardi* 218, *WI* 151; *Girmansyah* 1103; *Girmansyah Deden* 859, 880, 1037; *Hidayat AH* 3677, 3678; *Hidayat et al.* 4186, 4285; *Hoover & Wiradinata* 887; *Kartonegoro ARK* 231, 253; *Kjellberg* 1032; *M. Ardiyani et al.* 104; *Thomas & Ardi DCT* 08-55, 09-126; *Wardi* 004; *Widjaja & Agus Suyadi EAW* 8919, 9058; *Widjaja et al. EAW* 9721; *Wiradinata et al.* 12976; *Yoshida* 1236.
- Calanthe stenocentron* (Schltr.) M.W.Chase, Christenh. & Schuit.: N/A.
- Ficus lawesii* King: *Barbon et al.* 6119; *Corner NGF* 13517; *De Vogel* 3339; *Floyd NGF* 7423; *Foreman & Kumul NGF* 48336; *Gaerlan et al.* 10397; *Gray* 5216; *Hartley* 10298, 10406; *Henty NGF* 13656; *Hoogland* 3748; *Isles & Vinas NGF* 34453; *Kostermans* 4918; *Mabesa* 2-26; *Nautje BW* 6593; *Nooteboom* 5311; *Pullen* 5770; *Purseglove P.* 5183; *Ridsdale* 2415; *Rivera* 5239-3; *Schodde* 2663; *Schram BW* 10727; *Streiman & Lolean NGF* 18412; *Versteegh BW* 4966; *Womersley NGF* 9067.
- Gaultheria celebensis* (J.J.Sm.) Kron & P.W.Fritsch: *Eyma* 578.
- Gaultheria hendrianiana* (Argent) Kron & P.W.Fritsch: N/A.
- Gaultheria retusa* (Sleumer) Kron & P.W.Fritsch: *Ardi* 261, 272.
- Lasianthus chrysotrichus* Lauterb.: *Brass* 7223; *Lam* 797, 936, 975; *Ledermann* 9764; *Ridsdale & Galore NGF* 33463; *Van Leeuwen* 9200, 10727; *Van Royen & Sleumer* 6356, 6395; *Van Royen* 3564; *Versteeg* 1434.
- Medinilla medinilliana* (Gaudich.) Fosberg & Sachet: *Anderson* 140; *Koorders* 17860 β , 17861 β ; *Stone* 3813.
- Pandorea pandorana* (Andrews) Steenis: *Clemens* 1593; *Coode et al.* 8060; *Coveny & Rodd* 4567; *Coveny* 9749; *Cumming* 17794; *Dockrill* 833; *Forster PIF* 28803; *Frodin NGF* 26743; *Hartley* 12195; *Hubbard* 3215; *Jones* 2270; *Kairo & Streimann NGF* 30965; *Kalkmann & Vervoort* 4275; *Kooy* 1255; *Lam* 7536; *Millar & Van Royen NGF* 18746; *Pullen* 7474; *Smith* 04286; *Takeuchi & Damas* 4406; *Takeuchi et al.* 19492; *Van Balgooy* 5046; *Zippelius s.n.*
- Rhododendron torajaense* Craven: N/A.
- Thottea tomentosa* (Blume) Ding Hou: *Anthony SA* 859; *Anthonymsamy SA* 1084; *De Wilde & Duyffes* 20404; *De Wilde et al.* 21390; *Geesink & Santisuk* 5060; *Hallier s.n.*; *Hansen & Smitinand* 11809; *Imin et al. FRI* 77924; *Kiew & Anthonymsamy RK* 2935; *Larsen et al.* 30601; *Maxwell* 06-452, 11-30, 85-468; *Nair* 4273; *Pooma et al.* 5644; *Sadasivan* 3757; *Schiffner* 1913; *Van Balgooy* 5159; *Wirawan* 246; *Yao & Azril FRI* 65599; *Yao et al. FRI* 65422.