

UPDATE ON *ALOCASIA CUPREA* K.KOCH DISTRIBUTION IN NORTH KALIMANTAN

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ABSTRACT

ASIH, N. P. S. & LESTARI, D. 2022. Update on *Alocasia cuprea* K.Koch distribution in North Kalimantan. *Reinwardtia* 21(2): 49–53. — Hitherto Malaysian Bornean *Alocasia cuprea* K.Koch is a newly recorded species for North Kalimantan, taking *Alocasia* in Kalimantan to 10 species. An identification key and photos of *A. cuprea* are presented.

Key words: Araceae, Borneo, distribution, diversity, Krayan.

ABSTRAK

ASIH, N. P. S. & LESTARI, D. 2022. Kebaruan sebaran *Alocasia cuprea* K.Koch di Kalimantan Utara. *Reinwardtia* 21(2): 49–53. — *Alocasia cuprea* K.Koch sebelumnya ditemukan di Sabah dan Serawak, Malaysia, namun sekarang ditemukan di Krayan, Kalimantan Utara, Indonesia. Temuan ini menegaskan bahwa *Alocasia* di Kalimantan sekarang terdiri atas 10 jenis. Kunci identifikasi jenis dan foto tersaji dalam tulisan ini.

Kata kunci: Araceae, Borneo, distribusi, keragaman, Krayan.

INTRODUCTION

The last revision of *Alocasia* in West Malesia and Sulawesi was conducted by Hay (1998), yielding 31 *Alocasia* species. Since then, several new species have been described, six of which are from Borneo (Boyce, 2007; Hay, 2000; Kurniawan & Boyce, 2011; Wong & Boyce, 2016; Wong & Boyce, 2020) and two species are from Sulawesi (Yuzammi & Hay, 1998; 2002). These new species bring the total of *Alocasia* in West Malesia and Sulawesi to 39 species, with 26 species officially recognized as originating from Borneo.

Borneo, a center of *Alocasia* diversity (Wong & Boyce, 2016), is estimated to have 50 *Alocasia* species, the majority of which are endemic (Kurniawan & Boyce, 2011). Kalimantan is a large area in Borneo that is less well known (Kurniawan & Boyce, 2011). According to Hay (1998) and Kurniawan & Boyce (2011), it has acknowledged that there are only ten known *Alocasia* species in Kalimantan. However, the *Alocasia reginae* specimen with collection number *Burley et al.* 527 deposited in Harvard University's Gray Herbarium, is misidentified. *Alocasia reginae* is restricted in Mulu National Park's karst area (P.C. Boyce

2021, pers. comm., 13 November 2021). As a result, there are only nine species of *Alocasia* in Kalimantan. This number is only 35% of the total number of *Alocasia* in Borneo. This resulted to a great opportunity for fieldwork and a more intensive study of *Alocasia* in Kalimantan.

During fieldwork in 2016 in Kayan Mentarang National Park (KMNP), Krayan, North Kalimantan, many species of Araceae, including *Alocasia*, were collected. Some species have not been formally described. *Alocasia cuprea* K.Koch was known to be distributed in Sabah (Hay, 1998) and Serawak (Boyce, 2004), was also found in KMNP (Fig. 1). This first report on the distribution of *A. cuprea* in Kalimantan brings the number of *Alocasia* in Kalimantan to 10 species.

MATERIALS AND METHODS

Plant material was obtained from fieldwork in KMNP in May 2016. The material was cultivated in Eka Karya Bali Botanic Garden (EKBBG), Candikuning, Baturiti, Tabanan, Bali. The morphological characters were described based on this living collection. The habitat was recorded during the fieldwork in Pa' Pulid forest, near to Pa' Api

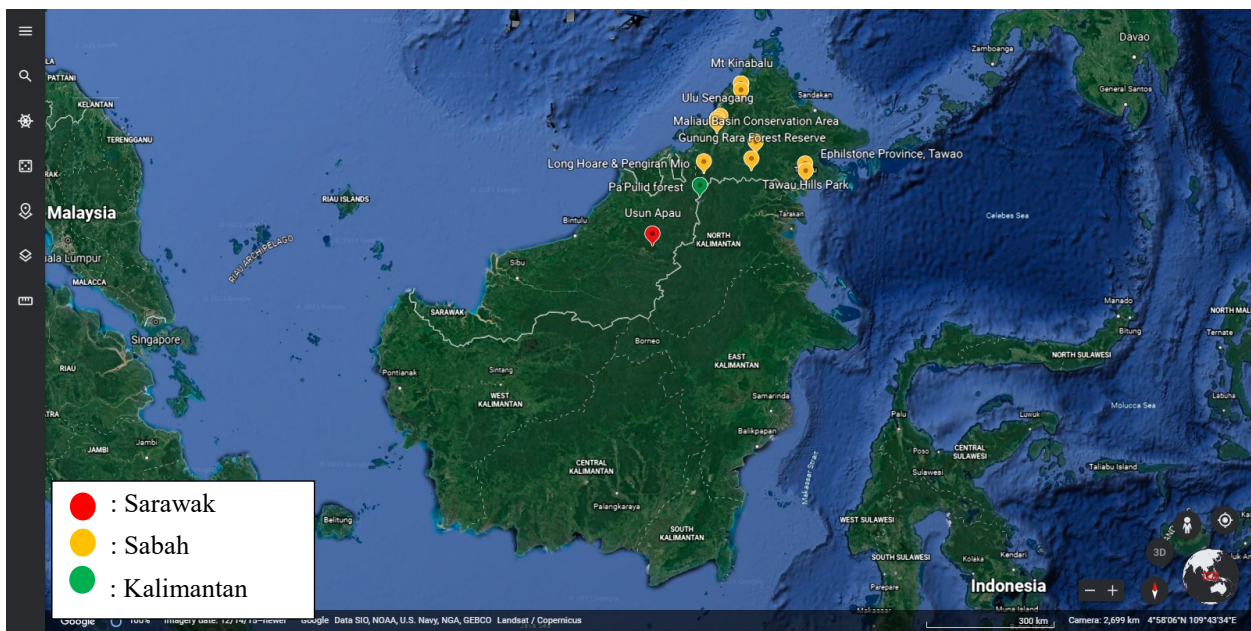


Fig. 1. Distribution of *A. cuprea* in Sabah (Boyce *et al.*, 2002; Sulaiman & Shunmugam, 2010; Wong & Joling, 2021), Sarawak (P.C. Boyce 2021, pers. comm., 13 November), and Krayan (North Kalimantan) (Google earth and modified by Ni Putu Sri Asih (unpublished data)).

village, Krayan, Nunukan, North Kalimantan. The identification key to *Alocasia* species was made based on Hay (1998).

RESULTS

TAXONOMIC TREATMENT

ALOCASIA CUPREA K.Koch

Alocasia cuprea (C.Koch & Bouché) C.Koch, Wochenschr. Vereines Befoerd. Gartenbanes Koenigl. Preuss. Staaten 4 (1861) 141; Engl. in A. & C. DC., Monogr. Phan. 2 (1879) 509; Ridl., J. Straits Br. Roy. Asiat. Soc. 44 (1905) 179; Engl. & K. Krause, Pflanzenr. 71 (IV.23E) (1920) 110; Merr., Bibliogr. Enum. Bornean Pl. (1921) 104; Merr., Pl. Elmer. Born. (1929) 26; Burnett, Aroideana 7 (1984) 76, figs 2 & 3. -*Caladium cupreum* C. Koch & Bouché, Ind. Sem. Hort. Berol., Appendix (1854) 6. Type: Not located, presumed destroyed at B. Neotype: Cult. RBG Kew ex Borneo, *N.E. Brown s.n.*, May 11th 1876 (K; lecto; selected by Hay, 1998).

[*Gonatanthus cupreus* C.Koch, Wochenschr. Vereines Befoerd. Gartenbanes Koenigl. Preuss. Staaten 4 (1861) 141 - nom. in synon.].

[? *Caladium metallicum* Ed. Otto, Hamburger Garten-Blumenzeitung (1853) 517, nom. subnud.; Koch, Berlinen. Allg. Gartenzeitung. 1 (1857) 135].

[*Colocasia cuprea* Engl., Araceae Exsiccatae et Illustratae No. 253 [date not ascertained, see Hay *et al.* (1995: 174)]. -? sphalm. pro *Alocasia cuprea*].

[*Alocasia metallica* Schott, Oesterr. Bot. Wochenbl. 4 (1854) 410, nom. nud.; Schott, Syn. Aroid. (1856) 46 (nom. superfl. pro *Caladium cupreum*); Hook., Bot. Mag. 86 (1860) t. 5190; Lemaire, Ill. Hort. 8 (1861) pl. 283; van Rottum, Fl. des Serres & Jardins 21 (1875) t. 2208-9].

Herb to ca. 49.5 cm tall; *rhizome* erect; *leaves* 3–4 together; *petiole* to ca. 46 cm long, each subtended by cataphyll, green-green yellowish at the tip than gradually green and ivory reddish at the base, adaxially faintly mottled greenish, abaxially not mottled and paler color, sheathing in the lower $\frac{1}{4}$ – $\frac{1}{3}$, green reddish at the margin; *blades* leathery, peltate, ovate, bullate between the main veins, adaxially glossy silver-green, green darker near the primary veins and midrib, abaxially deep purple, with a hyaline colorless margin ca. 1.5 mm wide; *anterior lobe* with the tip cuspidate and mucronate 4 mm; anterior costa with 4–5 primary lateral veins on each side, proximal ones diverging at ca. 125° then arching forward and outward to join a sub-marginal vein, distal primary veins diverging at ca. 55°; all primary veins with very conspicuous axillary glands abaxially; secondary veins forming well-defined undulating inter-primary collective veins; *posterior lobes* completely united except for



Fig. 2. Habitat of *A. cuprea*. A. *A. cuprea* in KMNP. B. *A. cuprea* cultivated in Bali Botanic Gardens. Photos by A. Dewi Lestari, B. Ni Putu Sri Asih.

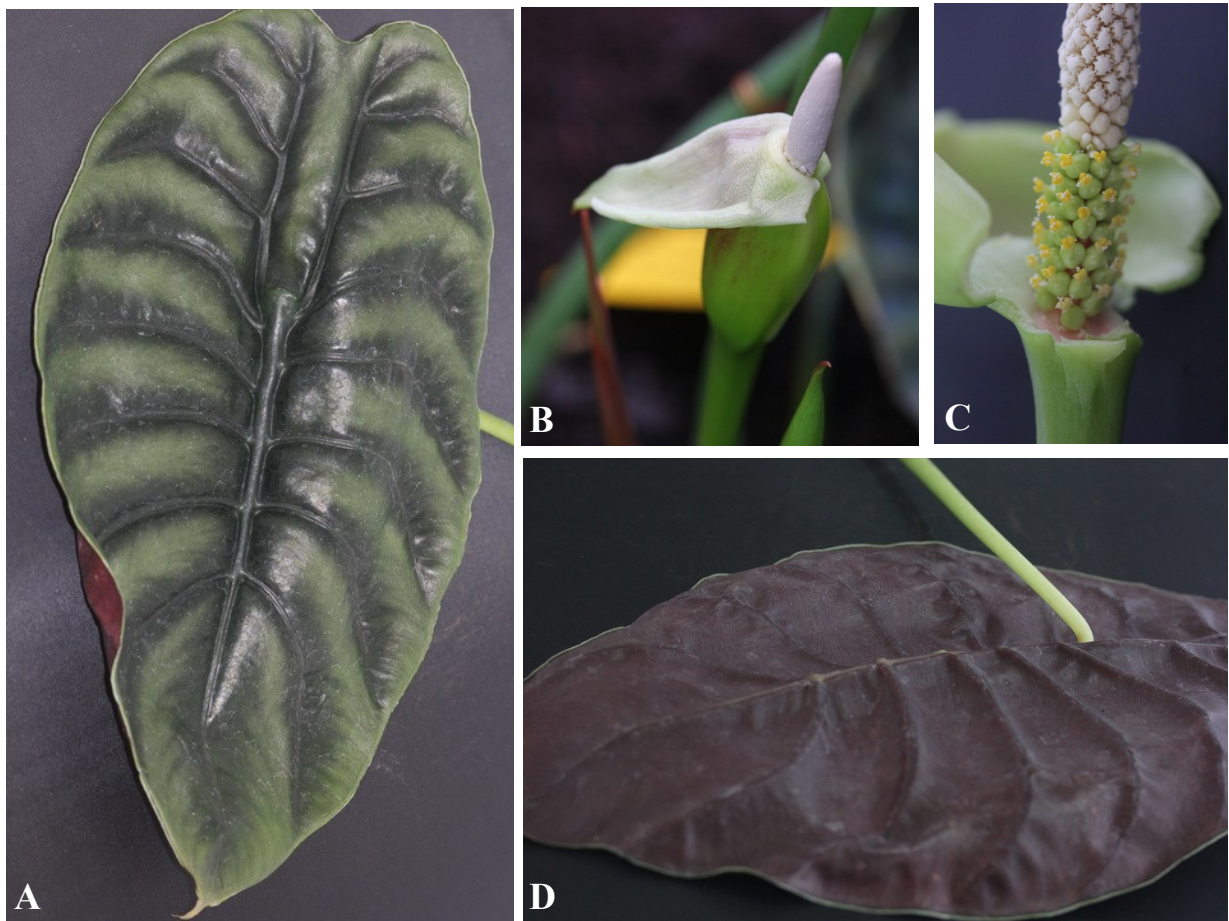


Fig. 3. Habitus of *A. cuprea*. A. The adaxial leaf. B. Flower which almost all male flower within lower spathe. C. Flower with artificial opened. D. The abaxial leaf. Photos by Ni Putu Sri Asih.

TAXONOMY

Identification key to *Alocasia* species in Kalimantan

- 1a. Leaf blades not peltate in adult plants 2
- 1b. Leaf blades shallowly to completely peltate in adult plants 7
- 2a. Leaf abaxially with prominent venation, interprimary vein well defined and leaf blade abaxially pubescent *A. sarawakensis*
- 2b. Leaf abaxially with no prominent venation, interprimary vein not well defined and leaf blade abaxially glabrous 3
- 3a. Leaf abaxially glaucous *A. robusta*
- 3b. Leaf abaxially not glaucous 4
- 4a. Male zone wholly exerted from the lower spathe chamber *A. macrorrhizos*
- 4b. Male zone half or completely within the lower spathe chamber 5
- 5a. Petiole about equaling length of leaf blade, blade very thickly leathery to almost succulent, ovato-sagittate to broadly ovato-sagittate *A. scabriuscula s.l.*
- 5b. Petiole much exceeding the length of leaf blade, blade thinly leathery to leathery but not succulent, narrowly triangular 6
- 6a. Leaf blades dark green and leathery, peduncle relatively short, male zone about half enclosed within the lower spathe chamber *A. princeps*
- 6b. Leaf blades grey-green and thinly leathery, peduncle relatively long, and male zone fully enclosed within the lower spathe chamber *A. principiculus*
- 7a. Leaf slightly peltate to deeply peltate, membranous or occasionally thinly leathery, plants often unifoliar, stigma stellate *A. longiloba*
- 7b. Leaf strongly to almost completely peltate, thickly coriaceous, leaves several, the main venation and lamina border not white to pale grey-green adaxially, stigma rounded 8
- 8a. Leaf bullate among the main veins, inflorescence paired 9
- 8b. Leaf not bullate among the main vein, inflorescence solitary *A. peltata*
- 9a. Leaf stiffly and thickly coriaceous, raised areas pale grey against a darker blade, abaxially pale green with the primary and margin veins purplish-brownish red, male zone $\frac{1}{3}$ – $\frac{1}{2}$ enclosed within lower spathe chamber *A. baginda*
- 9b. Leaf leathery, the bullate glossy bronze-green, abaxially the leaf and venation deep purple, male zone $\frac{2}{3}$ within lower spathe chamber *A. cuprea*

a shallow retuse notch, rounded; posterior costae diverging at ca. 30°; *inflorescences* 2 paired, subtended by green brown reddish cataphylls; peduncle to ca. 20 cm long, pale green reddish at the base and green light reddish-green at the tip, not mottled; *spathe* green to greenish maroon, ca. 11.6 cm long; lower spathe oblong ovoid, ca. 5.5 cm long ca. 2.4 cm diam; limb about equal to the lower spathe, at first erect and cucullate, then sharply deflexed, separated from the lower spathe by an abrupt constriction at the top of male flowers; *spadix* considerably shorter than the spathe ca. 8 cm long, very shortly stipitate, 1.5–5 mm, the color is pale red, cylindrical except appendix; *female zone* narrowly cylindrical, ca. 2 cm long, ca. 1.2 cm wide; ovaries subglobose, longitudinally 3–4-ribbed; stigma raised on a slender style ca. 1 mm, conspicuously 2–(–4) lobed, yellow at female flower anthesis; *sterile interstice* not attenuate,

isodiametric or slightly narrower than male, ca. 2 whorls of rhomboid synandrodia; *male zone* cylindrical, $\frac{2}{3}$ or all within the lower spathe, 2.7 cm long; synandria rhomboid, with the synconnective raised above but not overlapping the thecae; thecae opening by apical pores; *appendix* white, gradually tapering to the tip, blunt, faintly irregularly channeled, ca. 2.6 cm long; *fruit* unknown.

Distribution. Borneo: Sabah, Sarawak and North Kalimantan

Habitat. Terrestrial, riverbank to cliff of montane forest, sandy soil texture to leaf litter-covered brown humus soil, and open to moderate shade at 1,005 m asl. The soil where this species found in Kalimantan has 6.7 pH, and soil moisture 50%.

Notes. In Kalimantan, *A. cuprea* is currently found in Pa' Pulid forest, mountainous forest, that located in Pa' Api village, Krayan Distric. It is found in two small populations of three to seven individuals. This species found in Kalimantan differ from the former species in blade colour and number of primary veins. The blade colour of Kalimantan species is glossy silver-green adaxially with 4–5 primary vein, while the colour blade of the former species is glossy bronze-green adaxially with 8–11 primary vein. These variations, how ever, are common in *Alocasia* species.

The habitat of this species in Sarawak and Sabah is kerangas or heath forest (P. C. Boyce, 2021, pers. comm., 13 November). Kerangas forest has strongly acidic soil (Katagiri *et al.*, 1991; Suratman *et al.*, 2011). This condition differs with the soil in Pa' Pulid forest, where the soil tends to neutral pH. These different habitat findings indicate that this species is quite tolerant. Hay (1998) said this species appear to be unaffected by substrate, occurring on ultramafic, limestone and sandstone areas.

Specimen examined. INDONESIA, North Kalimantan, Nunukan, TN Kayan Mentarang, SPTN I Long Bawan, Krayan, Pa' Pulid, 20 May 2016, *Dewi Lestari 122/HK 1668* (Bali Botanic Gardens Accession E2016060025, THBB! BO!)

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AUTHOR CONTRIBUTORS

NPSA and DL are the principal author of this manuscript. Both authors analyzed the data and wrote the manuscript.

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