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Claoxylon (sect. *Affinia*) *dipulvinum* (Euphorbiaceae), a new species from the Moluccas, Indonesia

Adhy Widya SETIAWAN[1,2], Syuhada ASDINI[3], Tatik CHIKMAWATI[4,*], Peter C. VAN WELZEN[5]

1. Plant Biology Graduate Program, Department of Biology, Faculty of Mathematics and Life Sciences, IPB University, Bogor, 16680, Indonesia.
2. Re-mark Asia, Ciremai Ujung Street No 17 A-B, Bantarjati, North Bogor, 16150, Indonesia.
3. Departement of Enviromental, Health and Safety, Harita Nickel, Jakarta, 10270, Indonesia.
4. Department of Biology, Faculty of Mathematics and Life Sciences, IPB University, Bogor, 16680, Indonesia.
5. Naturalis Biodiversity Center, P.O.Box 9517, 2300 RA Leiden, The Netherlands & Institute of Biology Leiden, Leiden University, P.O. Box 9505, 2300 RA Leiden, The Netherlands.
[*]Corresponding author's email: tchikmawati@yahoo.com

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ABSTRACT: A new species of *Claoxylon* from Halmahera, Talaud and Obi Islands is described and photographed. The species shows similarity with *C. brachyandrum* and *C. longifolium*, but it differs from *C. brachyandrum* in having petioles with a double pulvinus, one basally and one apically (pulvini *ca.* 2 cm long), and it differs from *C. longifolium* in the number of stamens, being less than 30. The new species can be divided into two varieties, also new to science, differing in the colour of the indumentum, number of staminate flowers per node and number of stamens. An identification key to the varities, a distribution map, and illustrations are provided.

KEY WORDS: *Claoxylon*, Euphorbiaceae, Halmahera, new species, Obi, swollen pulvinus, varieties.

INTRODUCTION

Claoxylon A. Juss. (Euphorbiaceae, subfam. Acalyphoideae) is a mainly SE Asian genus, ranging from Madagascar up to the east Pacific (Hawai'i) with c. 80 species (Radcliffe-Smith, 2001); for the Flora Malesiana area 40 species are known. In his checklist for Sulawesi (or Celebes), the Moluccas and the Lesser Sunda Islands, Airy Shaw (1982) mentions twelve species of *Claoxylon* and of these only one is listed for the Moluccas, the area of interest (*C. longifolium* (Blume) Endl. ex Hassk.). The genus has flowers lacking petals, but most typical are the staminate flowers with 10 to many stamens of which the two thecae are separate and basally attached to the connective; in between the stamens often hairy, strap-like disc glands. Also typical, but not in all species evident, is the sandpaper touch of the dried leaves, caused by vertical needle-like crystals that penetrate the epidermis during drying (which is not the case in the other genera possessing the styloid crystals, they remain smooth: *Discoclaoxylon* (Müll. Arg.) Pax & K.Hoffm., *Erythrococca* Benth., *Lobanilia* Radcl.-Sm., and *Micrococca* Benth. (Kabouw *et al.*, 2008).

During a revision of the genus *Claoxylon* A.Juss. (Euphorbiaceae) for the Lesser Sunda Islands (Setiawan, ms.), for which only a checklist existed so far (Airy Shaw, 1982), nearby islands were also sampled in order to understand the full variability of the Lesser Sundanese species. During one of these explorations, Mr. Mahroji from Aketajawe-Lolobata National Park, Halmahera, Moluccas (Maluku Utara Province) found an unusual specimen. The specimen showed affinity with *C. brachyandrum* Pax & K.Hoffm., but differs in having double pulvinate petioles (apically and basally). There is also a resemblance with *C. longifolium*, but that species has far more stamens (35–50, instead of less than 30). During a Flora Monitoring Project in the area of Harita Nickelbays on Obi Island (Moluccas), another specimen was found that resembled the Halmahera entity. This new species belongs to Section *Affinia* Pax & K.Hoffm. (Pax and Hoffmann, 1914) based on a stamen number of less than 30. Pax and Hoffmann (1914) classify eight species in this section, none from the Moluccas and all morphologically different from the new species. Comparisons with relevant literature (Smith, 1981 (detailed description of *C. longifolium*); Holthuis and Lam, 1942; Backer and Bakhuizen van den Brink, 1964; Airy Shaw, 1982; Forster, 2007) and herbarium collections (BO & L) showed that the specimen differed from all other known species in this section.

The species is here newly described, and gaps in the variation are recognized on varietal level (colour differences, numbers of stamens).

TAXONOMIC TREATMENT

Claoxylon dipulvinum Setiawan, ***sp. nov.***

Figs. 1 & 2

***Type*:** Indonesia, Halmahera, Aketajawe-Lolobata National Park, 18 December 2018, flowering and fruiting. *Setiawan & Mahroji AWS 505* (holotype: BO, isotype: FIPIA).

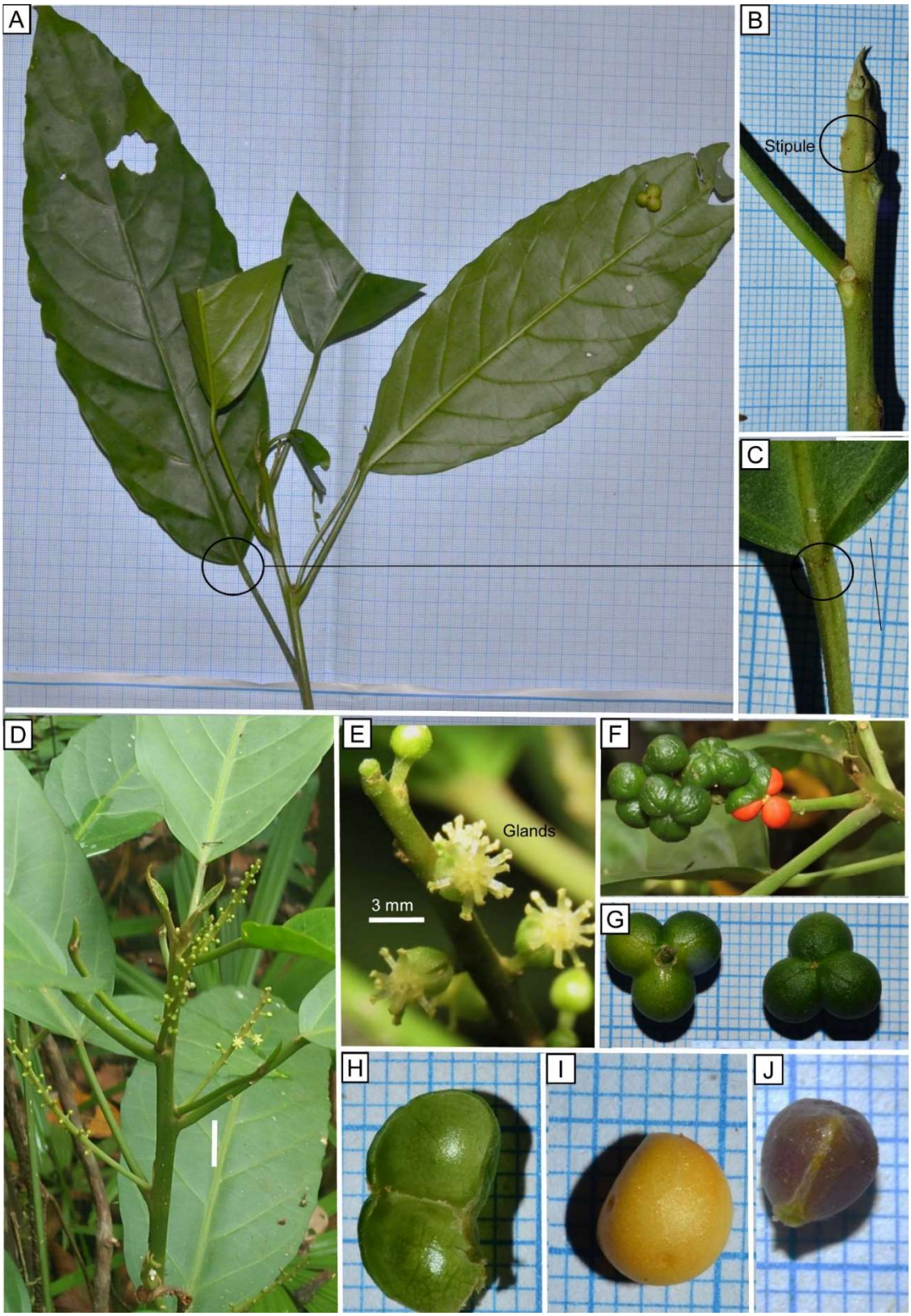

Fig. 1. ***Claoxylon dipulvinum*** Setiawan var. ***dipulvinum,*** **A**: twig apex, **B**: innovation, with stipule in circle, **C**: petiole with apical pair of glands (circle), **D**: twig with staminate inflorescences (scale = 1 cm), **E**: staminate flowers (scale = 3 mm), **F**: infructescence, **G**: fruit, adaxially and abaxially**, H**: inside of fruit, glabrous, **I**: seed in ventral view, smooth, **J**: seed in dorsal view showing rib (Photos A–C, G–J by Setiawan; D–F by Mahroji) *Setiawan & Mahroji AWS 505*.

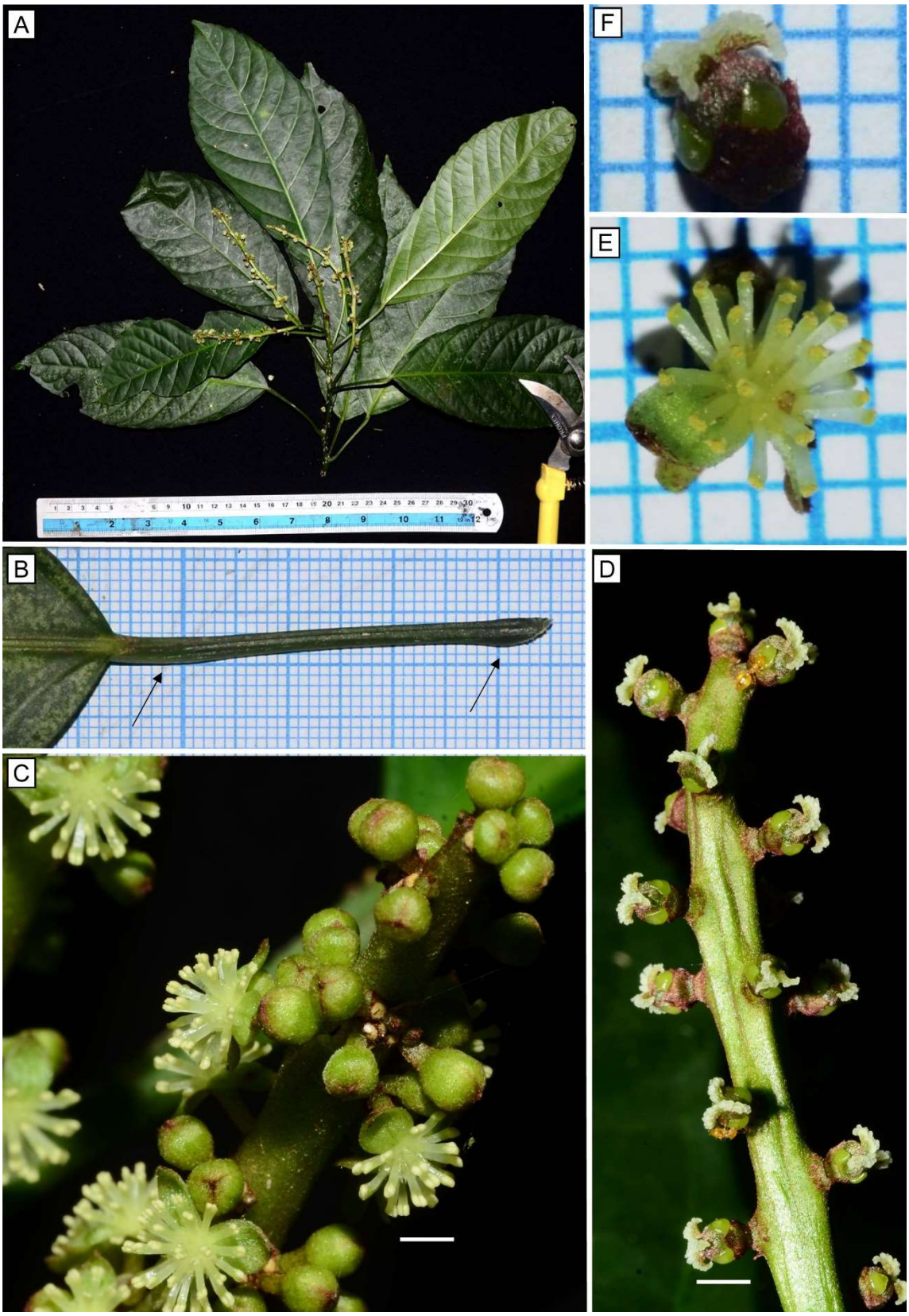

Fig. 2. ***Claoxylon dipulvinum*** Setiawan var. ***purpurascens*** Setiawan, **A**: flowering twig, **B**: petiole, with pulvinus apically and basally, **C**: staminate inflorescence (scale = 2 mm), **D**: pistillate inflorescence (scale = 3 mm); **E**: staminate flower, **F**: pistillate flower (*Setiawan AWS 585*).

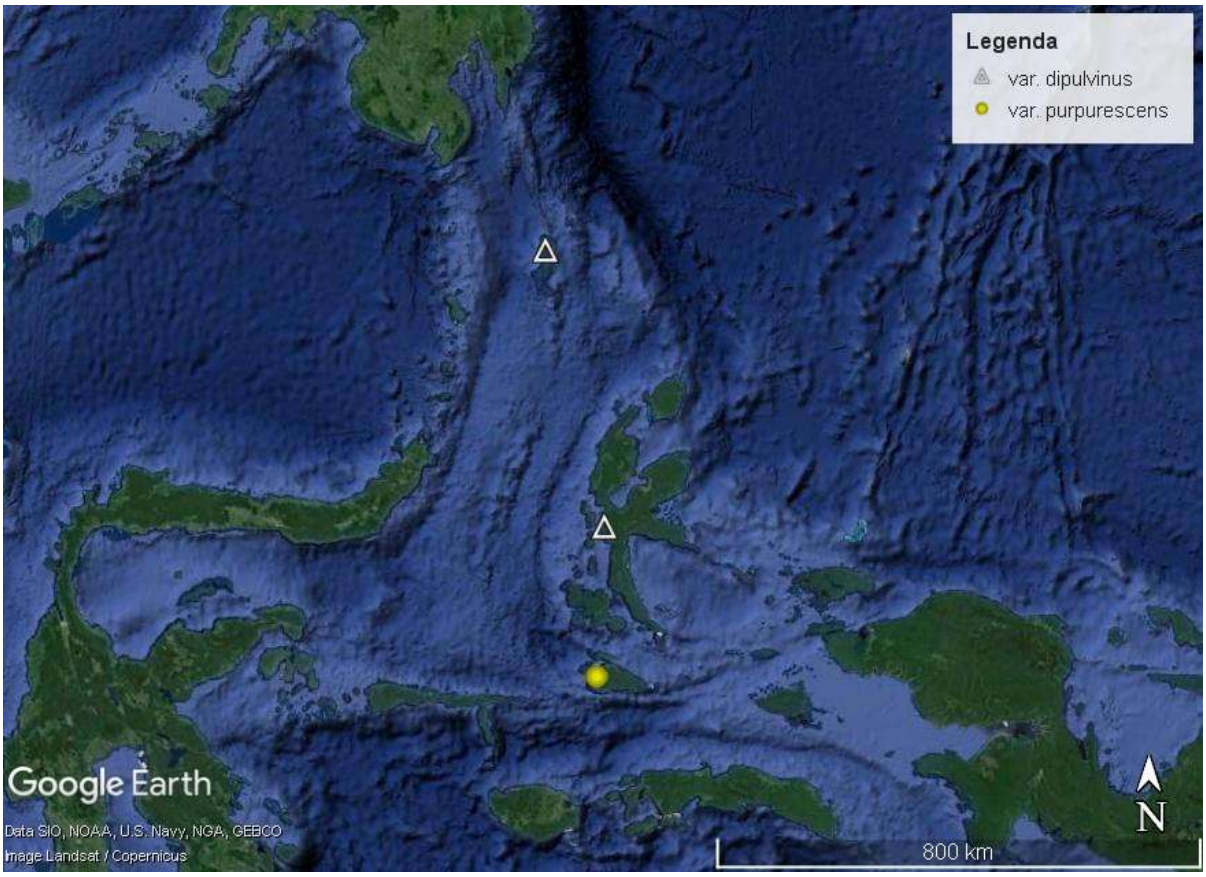

Fig. 3: Distribution of ***Claoxylon dipulvinum*** Setiawan, triangle = var. ***dipulvinum*** (Talaud and Halmahera Island), dot = var. ***purpurascens*** Setiawan (Obi Island).

Diagnosis: Resembling *C. brachyandrum*, but differing from that species in the bipulvinate petioles, and resembling *C. longifolium*, but having fewer stamens (<30). Petiole base and apex slightly swollen, pulvini *ca*. 2 cm long; *Stamens* < 30.

Description: Small shrub, to 2 m high, dioecious; stem round, solid; branchlets 2.3–5 mm diameter when flowers appear, green, puncticulate-lenticellate, scarcely hairy to pubescent. Stipules apiculate, 0.1–0.2 mm long. Petiole 40–80 × 0.3(–5) mm, pulvinate at base and apex, pulvini ca. 2 cm long, above shallowly grooved, glabrous (to very rarely sparsely hairy), with two small apical glands adaxially. Leaf blades oblong-elliptic, 7–24 × 2.2–8 cm, membranous to chartaceous, base cuneate, margin serrate, teeth 13–18, 1–3 per cm, apically mucronately glandular, apex acute to acuminate, glabrous on both sides; venation pinnate, secondary veins 8–10 per side, slightly sunken above, raised below, looped and closed near margin, higher order veins reticulate, rather inconspicuous. Inflorescences axillary, raceme-like thyrses, glabrous, staminate ones up to 7.5 cm long with 1–12 flowers per glomerule; pistillate ones 1.5–4.5 cm long with a single flower per node. Flowers: sepals 3, petals lacking. Staminate flowers: ca. 4 mm diameter; pedicel 1.2–2 mm long, with small yellow dots; sepals ovate, green; stamens 10–26, filaments connate at base; nectar glands mixed with stamens, yellow. Pistillate flowers: pedicel ca. 3 mm diameter; stigmas, 3, papillate above, white, with 3 pellucid glands. Fruits subglobose, shortly lobed, 3-locular, ca. 12 × 12 mm, dark green, wall thin, glabrous outside and inside, slightly keeled over the locules; pedicel very short, (1–)1.5(–2) mm long. Seeds subglobose, somewhat triangular in transverse section near white hilum, ca. 5 × 6 mm, smooth, with ventral rib, brown-white; arillode red.

Etymology: The epithet refers to the unique character of the apical and basal pulvinate parts of the petioles.

Phenology: Flowering and fruiting: June, October – December.

Habitat and distribution: Endemic in the Moluccas (see under varieties) in (rather intact) primary forest 30 m high, with little undergrowth, on seasonally dry hill sides, with loose-porous clayey soil, at least once reported from limestone on Halmahera. Elevation around 700 m asl (Fig. 3).

Notes*:* 1. Holthuis and Lam (1942) identified the plants as *C. longifolium*, but the specimens differ from *C. longifolium* in the number of stamens (< 30, versus 35–50 in *C. longifolium*), (sub)glabrous leaf blades (versus densely hairy in *C. longifolium*), bipulvinate

petioles (versus non-pulvinate in *C. longifolium*), and glabrous fruits (versus pubescent in *C. longifolium*).

2. It would be interesting to test this species with both varieties for hyper-accumulation of heavy metals. Both islands, Halmahera and Obi, are especially rich in nickel and quite a number of Euphorbiaceae (and the related Phyllanthaceae) are known for their accumulation of heavy metals. Recently, a new Euphorbiaceae genus, *Weda* Welzen (van Welzen *et al.*, 2020), was described with two new species for Halmahera that accumulates manganese.

Key to the varieties

1a. Leaves light green. Indumentum of inflorescences, staminate and pistillate flowers green; staminate flowers 1–3 per glomerule, stamens 10–17 ..... **a.** var. ***dipulvinum***
1b. Leaves dark green. Indumentum of inflorescences, staminate and pistillate flowers purpurascent; staminate flowers 7–12 per glomerule, stamens 25–26 ..... **b.** var. ***purpurascens***

a. var. ***dipulvinum***

Fig. 1

Type: as the species.

Description: Leaves light green when fresh. Indumentum of inflorescences, staminate and pistillate flowers green. Staminate flowers 1–3 per glomerule, stamens 10–17. Pistillate inflorescences 1.5–3 cm long.

Distribution: Halmahera and Talaud islands in the Moluccas (triangles in Fig. 3).

Additional specimens examined (paratypes): Indonesia, Halmahera, flowering, *Teijsman 5551* (BO); Talaud, Manusa, Garat, Loc. 11, clear forest, limestone, altitude 5 m, 14 June 1926, *Lam & Holthuis 3449* (BO1691788-89), fruiting; N. Moluccas, Halmahera, Central part, Akelamo Oba. 0°34′N, 127°36′E. 30 m. 7 December 1974, *de Vogel 4464* (BO), flowering.

b. var. ***purpurascens*** Setiawan, ***var. nov.***

Fig. 2

***Type*:** Indonesia, Obi Island, 10 October 2019, *Setiawan AWS 585* (holotype, BO!).

Diagnosis *and* ***description***: Leaves dark green. Indumentum of inflorescences, staminate and pistillate flowers purpurescent. Staminate flowers 7–12 per glomerule, stamens 25–26. Pistillate inflorescences ca. 4.5 cm long.

Etymology: The name refers to the purplish indumentum (Fig. 2) on parts of the flowers and inflorescences.

Phenology: Flowering in October.

Habitat and Distribution: Endemic on Obi Island in the Mollucas, occurring in primary, logged forest, 30 m high, with little undergrowth, 4–5 individuals found growing together in an open (cut) spot; elevation ca. 300 m asl (dot in Fig. 3).

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