



## A new species of *Homalomena* (Araceae: Homalomeneae) from Con Dao National Park, Vietnam, with lectotypification of *Homalomena philippinensis*

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ABSTRACT: *Homalomena perplexa* K.Z.Hein, Vuong, Bao & V.S.Dang from Ba Ria Vung Tau province, Vietnam, is described and illustrated as a species new to science. Description, color plates, discussion of similar taxa, phenology, distribution, and a preliminary conservation status assessment are provided. *Homalomena philippinensis* Engl. is lectotypified.

KEY WORDS: Aroideae, Con Dao Island, *Homalomena perplexa*, *Homalomena philippinensis*, Southeast region.

### INTRODUCTION

With an estimated number of over 500 species, *Homalomena* Schott (1832) belonging to the family Araceae, is the third-largest and yet most understudied aroid genus of very small to very robust, creeping to erect arborescent, terrestrial or lithophytic, solitary or clump-forming, mesophytic (seldom helophytic), usually aromatic herbs occurring from India to Southern China and Malesia to the Solomon Islands (Hay, 1999; Tung *et al.*, 2010; Boyce and Croat, 2011; Ng *et al.*, 2011). In the last two decades, many new species of *Homalomena* have been described from Borneo (Boyce, 2017; Wong *et al.*, 2021; Wong and Boyce, 2021b), New Guinea (Herscovitch and Hay, 2003), Peninsular Malaysia (Boyce and Wong 2017; Wong and Boyce, 2021a), and Sumatera (Boyce and Wong, 2016; Wong *et al.*, 2020) and more discoveries can be expected. The first *Homalomena* species described from Vietnam is *Homalomena occulta* (Lour.) Schott when the genus was erected by Schott (1832). However, Boyce in Boyce and Li (2010) noted that the correct application of the name *H. occulta* is obscure, and the type (probably collected from Hué in Vietnam) is lost. In the last revision of the genus by Engler (1912), he described 4 new species from Vietnam (viz. *Homalomena cochinchinensis* Engl., *H. philippinensis* Engl., *H. pierreana* Engl. & *H. tonkinensis* Engl.), and synonymized *H. occulta* as *H. aromatica* (Spreng.) Schott. Gagnepain (1942) listed *H. aromatica*, *H. cochinchinensis*, *H. pierreana* and *H. tonkinensis* for Vietnam. He left *H. philippinensis* from the list and added *H. gigantea* Engl. as a new record for Vietnam. But the latter species (*H. gigantea*) represents an undescribed

species (revealed after re-examination of the specimen cited by Gagnepain and checking with illustrations) and the true *H. gigantea* was described from the cultivated specimen at Bogor, originally collected from Borneo. Most recently, one new species, *H. vietnamensis* Bogner & V.D.Nguyen was described (Bogner and Nguyen, 2008).

During a botanical survey at Con Dao National Park, Ba Ria Vung Tau province, in May 2021, an unknown species of *Homalomena* was collected by Vuong *et al.* (BV 1691). Previously, Van (2022) identified that species as *Homalomena occulta* (Lour.) Schott, a species of dubious identity (Boyce and Wong, 2008), but clearly not that species by having distally weakly D-shaped petioles, and a capitate stigma. By contrast, in the protologue of *Calla occulta* Lour. which is the basionym of *Homalomena occulta* Schott, Loureiro (1790) described the species as having canaliculate petioles, and a trifid stigma. After investigation of relevant literature and comparison with available digitized type specimens from Vietnam and neighboring countries, it became apparent that the collected specimen did not match any other known *Homalomena* species. Thus, we consider it to represent a taxonomic novelty, here described as *Homalomena perplexa*. In addition, as a result of our re-examination of the three available syntypes of *Homalomena philippinensis* Engl., we found that both the vegetative and reproductive characters of two of the three syntypes, collected from Vietnam, are congruent with *H. perplexa*, but they are not conspecific with the other syntype collected from the Philippines. Therefore, we lectotypified for the name *H. philippinensis* Engl. as its syntypes are found to belong to more than one taxon.



## MATERIALS AND METHODS

The measurements and descriptions are based on the living flowering plants. Studied voucher herbarium specimens and additional alcohol-preserved material are stored at VNM Herbarium. The species description follows the notation/style of Boyce (2017) and implements the general plant descriptive terminology of Beentje (2016). Relevant type specimens of *Homalomena* species from Vietnam and neighboring countries were examined in different herbaria through high-resolution images accessed from <https://plants.jstor.org/> and Global Biodiversity Information Facility (GBIF) accessed from <https://www.gbif.org>. An assessment of conservation status was carried out following IUCN (2022), based on our current knowledge and the respective terminology on categories, criteria, and subcriteria.

## TAXONOMIC TREATMENT

*Homalomena perplexa* K.Z.Hein, Vuong, Bao & V.S.Dang, *sp. nov.* **Figs. 1–3**

**Type:** VIETNAM. Ba Ria – Vung Tau province, Con Dao National Park, 10 May 2022, *Truong Ba Vuong, Dang Van Son, Nguyen Quoc Bao, BV 1691* (holotype: VNM 00043081!; isotype: VNM 00043082!).

**Diagnosis:** This new species is distinguished from all other Vietnamese *Homalomena* species by the combination of triangular-sagittate to cordato-sagittate leaf blades lacking broken pellucid veins abaxially, a synflorescence with up to 5 blooms, slightly falcate and subcylindric-tapering spathe with ca. 1 mm long mucro, lageniform ovaries with capitate stigma, and cylindrical staminate flower zone which is contiguous with pistillate flower zone. *Homalomena perplexa* is most similar to *H. philippinensis* but readily distinguished by longer peduncle (up to 20 cm vs. ca. 8 cm), slenderer spadix (spadix width: length ratio 1:8 vs. 1:4.5) and stigma nearly equaling the ovary in width (stigma about half as wide as the ovary).

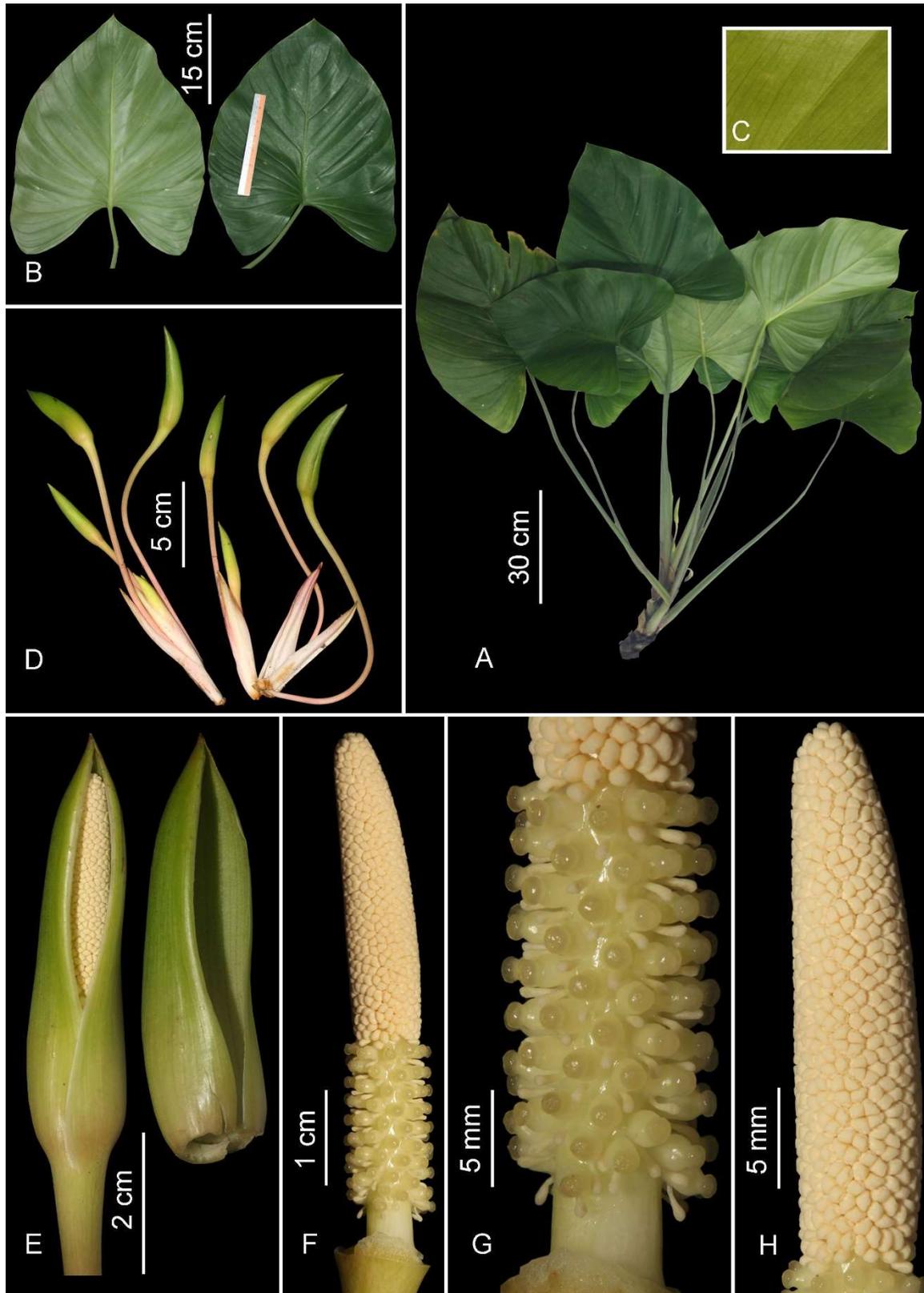
**Description:** Medium-sized, clumping, evergreen, aromatic (reminiscent of star anise), mesophytic herbs to 70 cm tall. **Stem** epigeal, erect, leafy, lower parts leafless and decumbent with active tip ascending, 3–4.5 cm in diameter. **Leaves** several together (up to 15), spirally arranged; **modules** subtended by a conspicuously 2-keeled prophyll up to 15 cm long; **petioles** erect, older ones ascending to spreading, 60–63 cm long, green, dull reddish brown basally, glabrous, non-sheathing portion weakly D-shaped (dorsally shallowly grooved) in cross section distally, terete proximally, 0.5–1.0 cm in diameter above petiolar sheath; **petiolar sheath** 25–32 cm long, ca. 2/5 of petiole length, persistent, wings 1.5–2.5 cm wide proximally, tapering distally, membranous, coloured as for petiole, margins incurved, minutely hyaline; **leaf blade** triangular-sagittate to cordato-sagittate, 34–43 cm

long, 25–39 cm wide, slightly coriaceous, glabrous on both sides, adaxially green, abaxially pale green, margin entire and minutely hyaline; **anterior lobe** triangular-ovate, apex acuminate and mucronate with ca. 3 mm long mucro; **posterior lobes** subtriangular, about 1/4 the length of the anterior lobe, apex rounded, sinus acute; **midrib** impress adaxially, rounded raised abaxially, ca. 8 mm wide at base, ca. 4 mm wide at centre then narrowing towards blade apex; **primary lateral veins** 8–10 per side, the lower 4 or 5 arising simultaneously and associated with posterior lobes, impressed adaxially, raised abaxially, curved towards apex when near margin; **interprimary veins** irregularly alternating with primaries, somewhat less conspicuous than primaries; **secondary and tertiary venation** almost invisible in fresh material. **Blooms** up to 5 together, produced sequentially in a simple synflorescence, each bloom subtended by prophyll up to 9 cm long, smelling of anise at anthesis; **peduncle** slender, terete, up to 20 cm long, ca. 0.7 cm in diameter at spathe insertion, smooth, pinkish green, pale pinkish white basally, erect to weakly arching at anthesis, thence sinuous-declinate; **spathe** slightly falcate, subcylindric-tapering, slightly inflated at the level of female zone, but not constricted, 4–5.5 cm × 1–1.3 cm at anthesis, tipped with a mucro ca. 1 mm long, spathe gaping at anthesis with margins slightly inflexing, spathe exterior green, interior light green with scattered minute paler glands. **Spadix** slightly shorter than the spathe, ca. 5 cm long including the stipe; **stipe** terete, ca. 0.5 cm long, ca. 0.4 cm in diameter, smooth, greenish white; **pistillate flower zone** about 1/3 length of spadix, ca. 1.6 long, ca. 0.8 cm in diameter; **pistils** crowded, slightly distant; **ovaries** lageniform, ca. 1.5 × 1 mm, greenish white; **style** very short, slightly narrower than ovary in diameter, greenish white; **stigma** capitate, ca. 1 mm in diameter, nearly equal to the ovary in diameter, translucent white; **interpistillar staminodes** oblong-clavate, ca. 1 mm long, ca. 0.4 mm at widest point, slightly shorter than the height of the associated pistil, ivory-white; **sterile interstice** between pistillate flower zone and staminate flower zone absent; **staminate flower zone** cylindrical, tip bluntly weakly tapering, ca. 2.9 cm long, ca. 0.6 cm at widest point, ivory; **staminate flowers** irregularly rhombo-hexagonal in plan view, each comprised of mostly 4 stamens, ca. 2 × 2 mm, anthers with 2 distinct thecae, each with a terminal crenate lobe, and overtopped by a large connective. **Infructescence** not seen.

**Distribution and habitat:** The new species is currently known only from the type locality in Con Dao National Park (Con Dao Island), Vietnam. It grows under the shade of the evergreen forest at an elevation between 100–350 m.

**Phenology:** Observed flowering in May.

**Etymology:** The specific epithet alludes to the taxonomic confusion made by Engler and Hong Thien Van by misidentifying it as *Homalomena philippinensis* and *H. occulta*.



**Fig. 1.** *Homalomena perplexa* sp. nov. **A.** Excavated plant, **B.** Leaf (left showing abaxial surface; right showing adaxial surface), **C.** Detail of abaxial surface of leaf blade, **D.** Detail of emerging blooms each subtended by prophyll, **E.** Bloom at pistillate anthesis (right showing artificially removed spathe), **F.** Spadix at pistillate anthesis, spathe artificially removed, **G.** Pistillate flower zone. **H.** Staminate flower zone. Photos by: Ba Vuong Truong.



Fig. 2. *Homalomena perplexa* sp. nov. A. Plants in habitat, B. Flowering plant. Photo by: Ba Vuong Truong.



Fig. 3. Holotype of *Homalomena perplexa* sp. nov. Photo by: Ba Vuong Truong.

**Vernacular name:** Thiên niên kiện nhâm.

**Uses:** Rhizome is used to treat joint pains and aches by local people.

**Provisional conservation status:** The new species is only known in Con Dao National Park, three populations of ca. 400 individual plants were found. So, we proposed the IUCN conservation status of *Homalomena perplexa* as Data Deficient (IUCN, 2022) until further study.

**Additional specimens examined (paratypes):** VIETNAM. Ba Ria – Vung Tau province, Con Dao National Park, 10 May 2022, *Truong Ba Vuong, Dang Van Son, Nguyen Quoc Bao, BV 1692* (VNM 00043075!).

**Notes:** This new species belongs to the *Homalomena* Supergroup *sensu* Boyce and Wong (2008), Ng *et al.* (2011) and Wong *et al.* (2013). The other described species of the *Homalomena* Supergroup from Vietnam are *Homalomena cochinchinensis*, *H. occulta*, *H. tonkinensis* and *H. vietnamensis*. The remaining species, *H. pierreana*, belongs to the Griffithii complex of the Chamaecladon Supergroup *sensu* Wong and Boyce (2008) which is characterized by tapering spathe up to 3 cm long, interpistillar staminodes much shorter than the height of the associated pistil, and staminate flowers each with four stamens.

Based on overall morphology, this new species is also similar to *Homalomena cochinchinensis* and *H. tonkinensis*. But *H. perplexa* is strikingly different from both species by leaf blades lacking broken pellucid veins



abaxially (vs. having broken pellucid veins abaxially in *H. cochinchinensis* and *H. tonkinensis*), by having a synflorescence which comprises up to 5 blooms (vs. up to 2 blooms in *H. cochinchinensis* and up to 8 blooms in *H. tonkinensis*), and by slightly falcate and subcylindric-tapering spathe (vs. oblongoid spathe in *H. cochinchinensis* and fusiform ellipsoid spathe in *H. tonkinensis*). The leaves and synflorescences of *H. perplexa* also resemble those of *H. pontederiifolia* Griff. ex Hook.f. from Thailand and Peninsular Malaysia, but the latter differs by having a sterile zone with gibbous staminodes between pistillate and staminate flower zones.

#### Typification of *Homalomena philippinensis* Engl.

Engler (1912) cited nine specimens as syntypes of *Homalomena philippinensis* Engl. Six of the syntypes (viz. Warburg 12492 (B), Bermejos 1526 (PNH), Ahern 3431 (PNH), Merrill 7279 (B), Piper 266 (PNH) & Robinson 6933 (B)) are presumably lost (Hay *et al.*, 1995). Only three syntypes (viz. Loher 2451 (CAL, CAL0000001480), Balansa 4819 (P, P02136862 & P02136863) & Tulmy *s.n.* (P, P02136864)) are available. However, after re-examination of the three available syntypes, Balansa 4819 and Tulmy *s.n.* represent *H. perplexa*, which were collected from Vietnam and are not conspecific with Loher 2451 which was collected from Luzon Island of the Philippines.

According to Art. 9.3 in the International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code, Turland *et al.*, 2018), *H. philippinensis* needs lectotypification as the syntypes were found to belong to more than one taxon. Here, we should select Loher 2451 at CAL as a lectotype as it is from the Philippines, and the species name that Engler meant for this species is the Philippines element. However, the syntype at CAL was badly preserved and floral details are not well-preserved owing to beetle damage. Fortunately, there is a much better preserved isosyntype (Loher 2451, barcode 00513024) at US. Although it was not seen by Engler, we considered part of the original material under Art. 9.4 of the International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code, Turland *et al.*, 2018). Thus, we have designated the Loher specimen (Fig. 4) at US as the lectotype, and also the specimen is indeed of the species now known as *H. philippinensis*. (Hay and Boyce, 2023, *pers. comm.*)

***Homalomena philippinensis*** Engl., Pflanzenr., IV, 23Da: 55 (1912) **Fig. 4**

**Type:** PHILIPPINES. Luzon central, Novaliches, Manila, 10.3.1891, A. Loher 2451 (lectotype US, barcode 00513024, examined on-line, designated here; isolectotype CAL, barcode CAL0000001480, examined on-line).

**Distribution:** The Philippines and Taiwan.



Fig. 4. The lectotype specimen at US of *Homalomena philippinensis* Engl. (barcode 00513024, © Smithsonian Institution).

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