

A New Verified and Vouchered Record of *Torenia polygonoides* (Linderniaceae) from Kalimantan

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ABSTRACT

Septian, Arifin Surya Dwipa Irsyam 2026. Catatan baru yang terverifikasi dan didukung oleh spesimen herbarium mengenai *Torenia polygonoides* (Linderniaceae) dari Kalimantan. Floribunda 9(1) 1–8 — Penelitian ini melaporkan keberadaan *Torenia polygonoides* Benth. (Linderniaceae) di Kalimantan, berdasarkan studi lapangan yang dilakukan di Kalimantan Barat pada Maret 2026. Catatan ini merupakan laporan pertama yang terverifikasi dan didukung oleh spesimen herbarium dari pulau tersebut, serta memperluas sebaran yang diketahui dari jenis ini di kawasan Malesia. Di Indonesia, jenis ini sebelumnya hanya tercatat dari Sumatra dan Nugini, meskipun telah dilaporkan dari Kalimantan dalam studi etnobotani yang tidak didukung oleh spesimen acuan. Catatan ini juga menyoroti terbatasnya pengetahuan taksonomi mengenai *Torenia* di Kalimantan dan menyediakan data dasar untuk studi taksonomi serta keanekaragaman hayati di masa mendatang. Selain itu, catatan ini menegaskan pentingnya eksplorasi botani lanjutan, khususnya pada habitat yang masih kurang dieksplorasi serta pada taksa yang masih kurang dipelajari di kawasan ini.

Kata Kunci: Indonesia, Lamiales, *Legazpia*, Malesia, *Torenia*.

Septian, Arifin Surya Dwipa Irsyam 2026. A new verified and vouchered record of *Torenia polygonoides* (Linderniaceae) from Kalimantan. Floribunda 9(1) 1–8 — This study reports the occurrence of *Torenia polygonoides* Benth. (Linderniaceae) in Kalimantan, based on fieldwork conducted in West Kalimantan in March 2026. This represents the first verified and vouchered record of the species from the island and extends its known distribution within Malesia. In Indonesia, the species was previously recorded only from Sumatra and New Guinea, although it has also been reported from Kalimantan in ethnobotanical studies lacking voucher-based confirmation. This record also highlights the limited state of taxonomic knowledge of *Torenia* in Kalimantan and provides baseline data for future taxonomic and biodiversity studies. It further underscores the importance of continued botanical exploration, particularly in under-explored habitats and among understudied taxa in the region.

Keywords: Indonesia, Lamiales, *Legazpia*, Malesia, *Torenia*.

INTRODUCTION

Torenia L. comprises 69 currently accepted species distributed across tropical and subtropical regions (POWO, 2026). The genus is

currently placed in the family Linderniaceae within the order Lamiales under the Angiosperm Phylogeny Group IV system (2016), although it was previously assigned to Scrophulariaceae. In Indonesia, 14 species

have been recorded, of which only two occur in Kalimantan, namely *Torenia crustacea* (L.) Cham. & Schltldl. and *T. violacea* (Azaola) Pennell (Wiriadinata, 2008; Rusdi *et al.*, 2019; Mustaqim *et al.*, 2021–onwards; POWO, 2026). Most species of *Torenia*, except for the *T. crustacea* (L.) Cham. & Schltldl. group, are characterized by poricidal capsule dehiscence, in which the capsule opens simultaneously on both sides of the septum in conjunction with calyx dehiscence, and by the presence of apical and internal hairs in the ovary (Fischer *et al.*, 2013). Another key diagnostic feature is the calyx, which is typically 5-winged, only rarely 3-winged, distinctly 5-angled, and 2-lipped (Yamazaki, 1990; Hong *et al.*, 1998; Hsieh & Yang, 2002).

Taxonomic studies of Scrophulariaceae, including *Torenia*, in the former Dutch East Indies were first comprehensively treated by George Bentham in 1835 in his publication *Scrophularinaeae Indicae* (Bentham, 1835). Since then, however, subsequent taxonomic work on the genus in Kalimantan has remained sparse and fragmentary, with only a limited number of studies specifically addressing its diversity and taxonomy in Borneo. Earlier treatments such as Burtt (1991), along with more recent compilations and checklists (*e.g.*, Wiriadinata, 2008; Mustaqim *et al.*, 2021–onwards; POWO, 2026), provide important baseline data but do not constitute a comprehensive taxonomic revision for the region. As a result, significant gaps persist in species delimitation, identification, and documentation, particularly in understudied habitats. Further detailed taxonomic research is therefore urgently needed to clarify the status of *Torenia* species in Kalimantan.

In this paper, we formally report the occurrence of *T. polygonoides* Benth. in Kalimantan, representing the first verified and vouchered record of the species from the island. Prior to this study, the species was known in Malesia only from the Malay Peninsula, Sumatra, the Philippines, and New

Guinea (Bentham, 1835; Mustaqim *et al.*, 2021–onwards; Rambe *et al.*, 2024; POWO, 2026). Although it has been reported from Kalimantan in ethnobotanical studies, these records lack taxonomic verification and voucher-based confirmation (Yusro *et al.*, 2010).

This record contributes to a better understanding of the species' biogeography within Malesia and helps fill an important gap in the documentation of regional plant diversity. Moreover, given the limited and fragmentary state of taxonomic knowledge of *Torenia* in Kalimantan, it provides baseline information for future taxonomic revisions and biodiversity assessments, particularly in poorly explored habitats where species distributions remain inadequately understood. The present study further underscores that *Torenia* remains a relatively understudied taxon in the region, highlighting the need for continued taxonomic and field-based research.

MATERIALS AND METHODS

Field study was conducted by the first author in March 2026 across several localities in West Kalimantan, Indonesia. Plant materials were collected directly in the field following the collection protocols established by the Royal Botanic Garden Edinburgh (2017). The materials were then processed and preserved using standard herbarium techniques as outlined by Bridson and Forman (1998). All voucher specimens have been deposited at the Herbarium Bandungense (FIPIA), School of Life Sciences and Technology, Institut Teknologi Bandung, and at the Herbarium UI Depok (UIDEP) (Thiers, 2026–continuously updated). In addition, the study was supplemented with images obtained from JSTOR Global Plants (plants.jstor.org). Specimens were identified with reference to Bentham (1835), Yamazaki (1954), Yamazaki (1990), Fischer (2004), and Fischer *et al.* (2013). Botanical terminology in this study follows Beentje (2016).

RESULTS AND DISCUSSION

Torenia polygonoides Benth., Scroph. Ind.: 39 (1835). — *Legazpia polygonoides* (Benth.) T.Yamaz., J. Jap. Bot. 30: 359 (1954). Type: Singapore, *N. Wallich* 3897 (holo? K!-image seen [K000899684]). Figures 1–2.

Legazpia mucronulata (Benth.) T.Yamaz., J. Jap. Bot. 30: 359 (1955).

Legazpia triptera Blanco, Fl. Filip., ed. 2.: 339 (1845).

Torenia cardiosepala Benth. in A.P.de Candolle, Prodr. 10: 409 (1846).

Torenia mucronulata Benth. in A.P.de Candolle, Prodr. 10: 409 (1846).

Small creeping herbs. Stems prostrate, quadrangular, ca. 1 mm in diameter, rooting at the nodes, purplish-brown to green, glabrous to sparsely puberulous; internodes 2–5 cm long, green, glabrous; branches slender. Leaves opposite; petioles short, 2–5 mm, reddish to green, sparsely hirsute; leaf blade broadly ovate, cordate to subreniform, 7.5–12 × 6.5–13 mm, base truncate to cordate or attenuate, margin crenate-serrate, ciliate, apex rounded, slightly fleshy, adaxial surface shiny green to yellowish-green, abaxial surface paler, glabrous on both surfaces but sparsely scabrid along the nerves beneath; lateral veins 4 on each side. Inflorescence with lateral paracchia, 1–5-flowered; peduncles up to 15 mm long, green, glabrous; pedicels 3–5 mm long, green, glabrous; bracts 2, acerose, ca. 1 mm long, green, glabrous; flowers bisexual and zygomorphic. Calyx connate, suborbicular, 4–6 × 3–4.5 mm, base auriculate, apex shallowly 3-lobed, yellowish-green, pubescent; prominently 3-winged between the ridges, margin ciliate, with semicircular wings up to 2 mm wide. Corolla strongly bilabiate, up to 12 mm long, white, slightly exceeding the calyx in length; tube cylindrical, curved, white;

lower lip 3-lobed, ca. 3 × 4 mm, white with a yellow spot near the base; upper lip ca. 3 × 2 mm, entire, reddish-brown and pubescent on the outer surface; lobe apices obtuse. Stamens 4, didynamous; the two anterior filaments each bearing an appendage, the appendages clavate with yellow apices, anther dorsifixed, oblong, ca. 0.8 mm long, locule divaricate. Ovary ellipsoid, ca. 2 mm long, white, glabrous; ovules many, minute, reddish; style filiform, ca. 9 mm long, white; stigma 2-lamellate, ca. 1 mm long, white to purplish. Capsules septicidal, oblong-ovoid, ca. 5 mm long. Seeds numerous, minute, ca. 0.3 × 0.3 mm, bothrospermous.

Distribution. *Torenia polygonoides* has been recorded from Thailand, Assam, Myanmar, southern China, Indochina, Malaya, the Philippines, Micronesia, and New Guinea (POWO, 2026). It is here newly recorded from West Kalimantan.

Habitat and Ecology. The species was observed growing at low elevation (ca. 3 m a.s.l.) along the margins of small watercourses and irrigation channels. It occurs on moist, periodically inundated substrates at the roadside within open plantation areas, where it forms creeping patches among grasses and other low vegetation. The habitat is characterized by high light exposure and consistently damp conditions, reflecting its preference for disturbed, lowland environments associated with human-modified landscapes (Figure 2).

Specimens examined. INDONESIA. KALIMANTAN— **West Kalimantan:** Sambas Regency, Teluk Keramat, Sekura, Gang H. Manaf S., 1°29'24.96" N, 109°12'9.46" E, 3 m asl, 18.III.2026, *Septian SS006* (FIPIA, UIDEP).



Figure 1. General habit of *Torenia polygonoides*, showing prostrate stems, opposite leaves, and flowering branches. Voucher specimen SS006 deposited at Herbarium Bandungense (FIPIA). Scale indicated by ruler (cm).

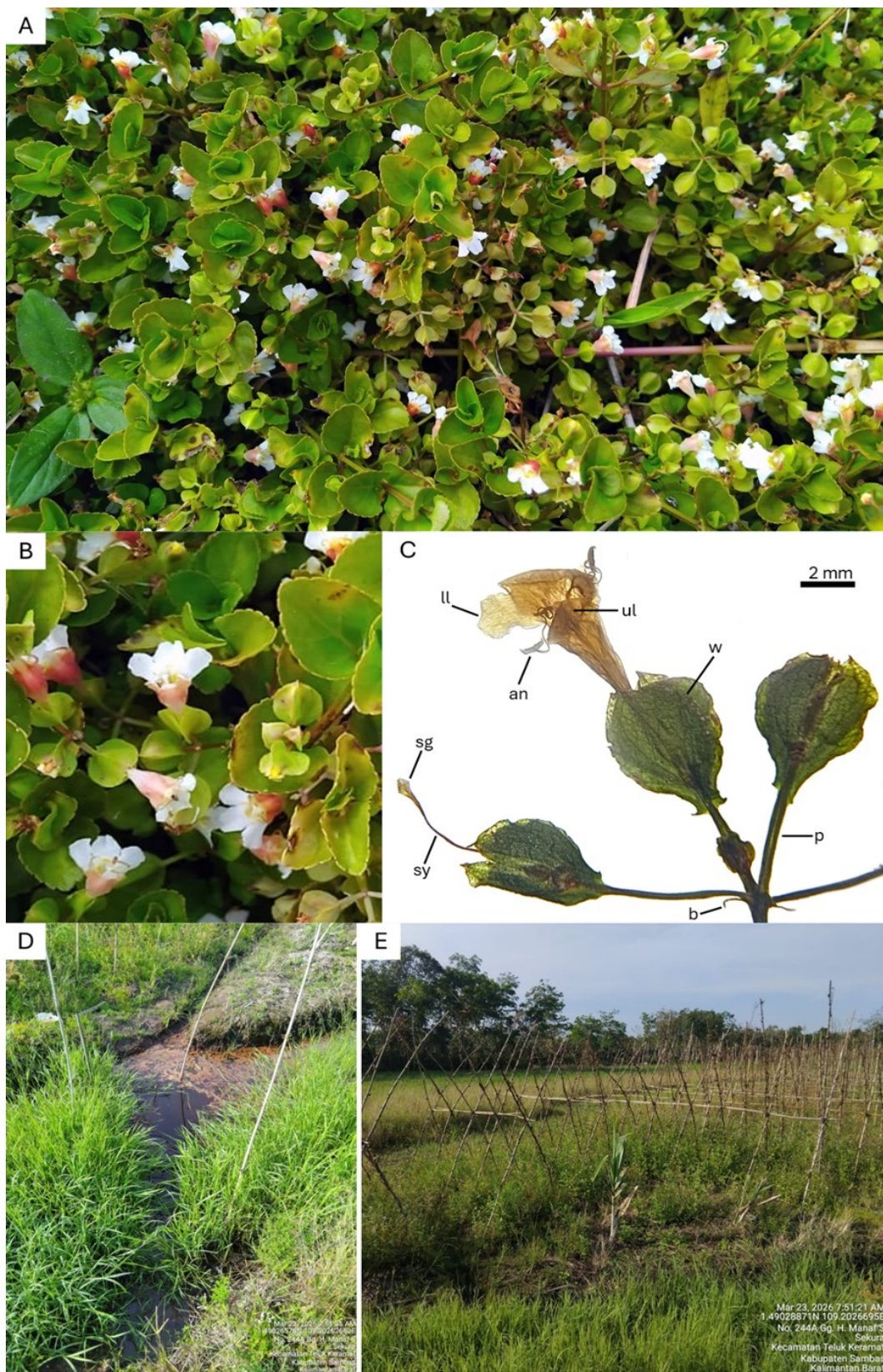


Figure 2. *Torenia polygonoides* in its natural habitat. A. Dense mat-forming growth habit in situ, B. Close-up of flowers, C. Floral parts (an= anther; b=bract; ll= lower lip; p= pedicel; sg= lamellate stigma; sy= style; ul= upper lip; w= calyx wing), D. Habitat along small watercourses and irrigation channels, E. Open plantation landscape at roadside where the species occurs.

Note. *Torenia polygonoides* is readily distinguished from all other species of *Torenia* by its unique calyx morphology, bearing three prominent, semicircular wings. In contrast, all other species in the genus characteristically possess a 5-winged calyx, typically with narrow or linear wings. Correspondingly, the calyx in most *Torenia* species is 5-lobed, with each lobe associated with a wing aligned along its midvein. In *T. polygonoides*, however, the calyx is 3-lobed and bears three wings that are positioned between the midveins rather than directly along them.

An earlier report of *T. polygonoides* from West Kalimantan was documented in an ethnobotanical study conducted in Bukit Kelam (Yusro *et al.*, 2010). However, the absence of voucher specimens and detailed taxonomic treatment in that study prevents independent verification of the species identity. This is further supported by the fact that *T. polygonoides* has not been reported from Kalimantan in subsequent taxonomic treatments (e.g., Fischer *et al.*, 2013; POWO, 2026). The present study, based on a verified and vouchered specimen, therefore provides the first taxonomically confirmed evidence of the species in Kalimantan.

In addition, an unpublished report entitled Flora Taman Nasional Sebangau, prepared by the Botany Division of the Research Center for Biology - LIPI, also recorded *T. polygonoides* from Central Kalimantan (Widjaja *et al.*, 2007). Taken together with the present findings from West Kalimantan, these records suggest that the species may have a broader distribution in Borneo than currently documented in taxonomic literature, and potentially extending more broadly across parts of Malesia. They further indicate that *T. polygonoides* may be under-recorded in the region, likely reflecting a combination of under-collection and the limited availability of taxonomically verified records. These observations emphasize the importance of integrating systematic field surveys with rigorous taxonomic verification to better resolve species distributions in Borneo.

The historical presence of *T. polygonoides* in Kalimantan remains uncertain. This pattern

may reflect either under-collection or a recent introduction, particularly given its occurrence in disturbed habitats. Alternatively, the species may have been present in the region prior to its formal documentation but was overlooked in earlier botanical works, including those of Bentham (1835). Further evidence is needed to clarify its biogeographical status.

Additional evidence supporting these possibilities comes from observations on social media platforms and records available on iNaturalist, which indicate that *T. polygonoides* has also been documented from Sumatra (Jambi, Riau, South Sumatra) and Sulawesi (North Sulawesi) (iNaturalist Community, 2026). Furthermore, iNaturalist data indicate that the species has been recorded from several additional localities in West Kalimantan, namely Kubu Raya, Kapuas Hulu, and Bengkayang (iNaturalist Community, 2026).

Although these records remain informal, they suggest that the current understanding of the species' distribution may be incomplete, particularly in regions lacking formal taxonomic documentation, and therefore these records require further taxonomic verification. Taken together, these observations point to the possibility of a broader, previously undocumented range and highlight the potential influence of anthropogenic factors on its distribution. They also emphasize the value of integrating traditional taxonomic approaches with emerging citizen science data to improve our understanding of species distribution patterns, particularly among understudied taxa in Borneo.

To better understand the factors underlying this potentially broad distribution, the dispersal mechanisms of *T. polygonoides* should be considered. Its dispersal is likely facilitated by multiple pathways. Given its occurrence in periodically inundated habitats, such as along streams and irrigation channels, hydrochory likely plays an important role. The very small seeds (ca. 0.3×0.3 mm) can be easily transported by flowing water, facilitating dispersal along drainage systems and into adjacent habitats. In addition, their minute size increases the likelihood of un-

intentional dispersal by animals or through human-mediated vectors, such as adhering to vehicle tires or footwear.

Furthermore, the capsule fruit may contribute to local dispersal through mechanical seed release, potentially ejecting seeds away from the parent plant. In addition to seed-based dispersal, *T. polygonoides* is also capable of vegetative propagation, as its prostrate stems readily root at the nodes, allowing the plant to spread through fragmentation. Collectively, these strategies likely facilitate

wider dispersal and contribute to the species' broader distribution across suitable habitats.

The occurrence of *T. polygonoides* in disturbed, lowland habitats such as irrigation channels and roadside plantations indicates that these environments are likely underexplored and may play a greater role in shaping the species' observed distribution than previously recognized. These findings further highlight the importance of considering anthropogenically influenced habitats in future floristic and taxonomic studies.

Key to the species of *Torenia* in Borneo (modified from Yamazaki (1990), Burt (1991), and Fischer *et al.* (2013)).

1. A. Calyx suborbicular, 3-winged *Torenia polygonoides*
 B. Calyx tubular, 5-winged 2
2. A. Capsule dehiscence poricidal, with openings forming on both sides of the septum simultaneously with calyx dehiscence; ovary bearing apical and internal hairs 3
 B. Capsule dehiscence septicidal; ovary lacking apical hairs and hairs within the locule *Torenia crustacea*
3. A. Herbs up to 2 m in height; leaf blade ovate-lanceolate to ovate or ovate elliptic, 7–12.5 × 2–4 cm; flower large, corolla 4–6 cm long
 *Torenia cyrtandriflora* (endemic to Sarawak)
 B. Herbs up to 40 cm in height; leaf blade ovate, 1.5–4 × 1–3 cm; flower small, corolla 2–2.5 cm long *Torenia violacea*

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